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SPECIAL REPORT

OF THE

BOARD OF HEALTH

UPON THE

7793.49

CHOLERA EPIDEMIC

IN

HONOLULU, HAWAIIAN ISLANDS,

IN

AUGUST AND SEPTEMBER, 1895.

HONOLULU:
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1896.

John V. Murray

Aug 28 1900

SPECIAL REPORT

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Honolulu, Hawaiian Islands, in August and September, 1895.

To His Excellency,

SANFORD B. DOLE,

President of the Republic of Hawaii,

Sir:—

It has been deemed desirable by the Board of Health to make a special report upon the epidemic of cholera which prevailed in the City of Honolulu during the months of August and September, 1895. The reports of the physicians and others hereto appended give full details of certain features of the epidemic, but it seems proper that a general statement should be made upon the subject, and that certain points should be touched upon which have not been covered by those reports.

In undertaking to make this general statement some of the same ground will doubtless be gone over, which has been covered by those reports, but in giving a connected narrative this result cannot well be avoided.

The first information which the Board of Health had that cholera existed here was received on Tuesday morning, August 20th, at about eleven o'clock. Dr. H. V. Murray reported to the Board that he had a patient at Iwilei in the suburbs of the

City whom he believed was suffering from Asiatic cholera. The premises upon which the patient resided were immediately placed in quarantine under a police guard, and Doctors Day and Wood at once investigated the matter and examined the patient.

Subsequent events proved that Doctor Murray's diagnosis was correct, and between that time and until the last case appeared there were in all eighty-seven cases, of which sixty-nine were typical cases of Asiatic cholera. The list of patients appended to the report of Doctor N. B. Emerson herewith gives the names, sex, age, nationality, etc., of each case.

The report of Doctor F. R. Day, Port Physician and member of the Board of Health, presents an account of the introduction of the disease.

The report of Doctor C. B. Wood, member of the Board of Health, is a general medical report of the epidemic.

The report of Doctor R. P. Meyers is a statement of his work as Medical Inspector and as one of the physicians at the cholera hospital.

The report of Doctor N. B. Emerson, member of the Board of Health, relates to the cholera hospital, and the treatment of the patients at the hospital.

The report of Doctor J. K. Smith is upon the disinfection of premises in which cases of cholera occurred.

The next report is that of Doctor F. R. Day upon the bacteriological examination of specimens made during the prevalence of the epidemic.

The report of Mr. J. F. Colburn is upon the work of the Citizens' Sanitary Committee.

There is also added the report of a committee consisting of Doctor C. B. Wood, Mr. J. T. Crawley, chemist, and Mr. B. F. Dillingham upon the matter of contamination of soil and water by cholera germs. Also a report of a committee, consisting of H. R. Hitchcock, W. L. Wilcox and J. K. Smith, M. D., upon the destruction of crops of taro and vegetables, known as the Kunawai patches, near the Insane Asylum.

INTRODUCTION OF THE DISEASE.

In view of the accumulation of evidence both direct and circumstantial there can be no doubt as to the fact that the disease was introduced by the O. & O. S. S. "Belgie," which arrived at the port of Honolulu on the afternoon of August 9, 1895. This vessel arrived from the port of Yokohama after a voyage of twelve days. She had also touched at the port of Kobe a few days before leaving Yokohama on her voyage from Hong Kong to Honolulu. Asiatic cholera was epidemic in Japan at the time. There were over five hundred Chinese immigrant passengers in the steerage from Hong Kong on their way to Honolulu. Three of these passengers died on the voyage between Yokohama and Honolulu. The cause of death of these three passengers was reported by Dr. Bowie, surgeon of the "Belgie" to have been as follows: two of "heart disease" and one of "pneumonia." Without necessarily impeaching the veracity of Dr. Bowie, the evidence seems to justify the statement that all three of these passengers were affected with Asiatic cholera.

Upon the arrival of the "Belgie" at Honolulu another of the passengers was reported by Dr. Bowie as being sick with a slight fever. This man, together with the other steerage passengers, was removed to the quarantine island the next day, August 10th. After reaching the quarantine island he was taken with violent vomiting and purging accompanied by cramps, and died the next day, August 11th. A young Chinese, who attended the sick man was suddenly taken ill on August 12th, with violent purging, vomiting and cramps in the abdomen and extremities. He became rapidly emaciated, his body was cold, and he died the next morning at 9 a. m., after an illness of only fifteen hours. While the symptoms of the disease with which these two men were affected aroused suspicions that they were those of Asiatic cholera, the fact that the discharges were "dark like molasses," and in view of the statements of the surgeon of the ship of the causes of death of the three who died upon the voyage, the physicians who examined the cases at the quarantine island

were not prepared to declare that the disease was Asiatic cholera.

It should be here stated that one of the grounds for belief that the three passengers who died on the voyage had cholera, is based upon the affidavits of certain of their fellow passengers in regard to the symptoms which they manifested during illness, but this information was not obtained until after the death of the two Chinese on the quarantine island. And the fact that the sick passenger, who was removed from the ship to the island vomited in the scow, while being transferred, was not made known until after the disease had appeared on shore.

The immigrants at the quarantine island were held in strict quarantine, and had no communication with the people on shore. But the excreta of the sick persons evidently became mixed with the water of the harbor. This may have been from the closets on the quarantine island, from the vomit of the man in the scow, or from the washings of the ship while lying in the harbor; or, what is most likely, from all three sources. The evidence of the infection of the water of the harbor was subsequently established beyond a peradventure. This water being thus infected the fish, crabs and other shell fish became infected, and the Hawaiians, who make a practice of eating such things without being cooked, were exposed to infection.

The fact is well established that the two women first taken with cholera at Iwilei had eaten crabs caught in the shoal water between Iwilei and the quarantine island two or three days before they were taken ill.

Many of the persons who were subsequently taken with the disease had been eating raw fish and crabs taken from the harbor. The sailor of the U. S. S. "Bennington," who died of cholera August 29th, had been bathing in the harbor. This sailor had not been allowed to go on shore for about a month prior to his being taken sick, and upon the most careful investigation by the surgeon and officers of the ship no other manner of exposure could be ascertained.

STEPS PURSUED TO PREVENT THE SPREAD OF THE DISEASE.

The steps pursued to prevent the spread of the disease were briefly these:

Immediate attention given to the patient as soon as the case was reported.

Thorough disinfection of the house in which the patient was found.

Fumigation, disinfection or destruction of all clothing and bedding exposed to infection so far as could be ascertained.

Strict quarantine of all persons who had been exposed to contagion.

Careful and unremitting treatment of each patient.

Strict quarantine as between the district of Honolulu and the other districts of the Island of Oahu; and between the Island of Oahu and the other Islands of the group.

Careful guarding of all sources of water supply.

Cleansing the city, disinfecting privy vaults and all foul places, white-washing premises with lime and removing garbage and refuse.

Prohibition of the use of fish, or any product of the sea, or water.

Closing of schools, public and private.

Forbidding the gathering of people in large numbers in any one place. And prohibiting church and Sunday-school services.

Fumigation of mails, and prohibiting the carrying of letters from Honolulu to any other part of the Islands excepting through the mails.

Restricting the taking of freight from Honolulu to any other part of the Islands to such articles as were absolutely necessary and these only under strict inspection and careful fumigation.

The inspection of every dwelling house in the district of Honolulu.

The prevention of persons changing their place of residence without the permission of the Board of Health.

And other similar regulations, the most of which will appear in the regulations which were published, copies of which are hereto appended.

As soon as the Board was satisfied that the disease was cholera a sanitary inspection of the city was established. The city was at once divided into ten districts, and a medical sanitary inspector appointed to each district. The following is a list of the physicians thus appointed, with the description of each district:

Dr. Myers. Section No. 1. Lying between Palama road and the shore and from the harbor indefinitely westward.

Dr. G. Herbert. Section No. 2. Lying between Palama road and Judd street and from Liliha street westward.

Dr. Wayson. Section No. 3. Bounded mauka by School street, makai by Palama road, Nuuanu river and Beretania street, east by Nuuanu street, west by Liliha street.

Dr. Emerson. Section No. 4. Bounded mauka by School street, makai by Beretania street, east by Kinau and Alapai street, west by Nuuanu street.

Dr. Cooper. Section No. 5. Bounded mauka by Beretania street, makai by water front, east by Nuuanu street, west by harbor and stream.

Dr. Wood. Section No. 6. Bounded mauka by Beretania street, makai by the water front, east by Alakea street, west by Nuuanu street.

Dr. Howard. Section No. 7. Lying between Beretania street and the sea and east of Alakea street.

Dr. Smith. Section No. 8. Lying mauka of Beretania street and east of Kinau and Alapai streets.

Dr. Day. Section No. 9. Lying between School and Judd streets, and between Liliha and Punchbowl streets.

Dr. Monsarrat. Section No. 10. Nuuanu valley, lying above the line of Judd street.

Later the Citizens' Sanitary Committee was established. This committee divided the city into twenty-one districts, with an inspector for each district, and these districts were again

divided into Apanas. There were in all one hundred and fifty-one Apanas and two hundred and fifty-six sub-inspectors. The work of the Citizens' Sanitary Committee is referred to more particularly in the report of Mr. Colburn, the chairman.

Besides this organized work of the citizens' committee, a large number of citizens volunteered and served in many other capacities; in guarding the valleys; assisting at the headquarters of the Board; at the hospital; and in every way in which they could be of service. These services offered and rendered voluntarily, without hesitation, fear of exposure or hope of personal reward were of inestimable value, and contributed greatly to the success of the Board in combatting the disease.

CITY WATER SUPPLY.

The public water supply for the city of Honolulu has heretofore been solely from surface water held in reservoirs in the valleys back of the city, and conducted by pipes to every part of the city. Fortunately the powerful pumping plant, for pumping artesian water was completed a short time before the epidemic appeared, and so arranged that water could be forced into the city mains from the artesian wells. As soon as practicable, after the physicians were satisfied that the disease was cholera the water was shut off from the valley reservoirs and connection made with the artesian supply. This artesian water is pure and wholesome, and sufficient in quantity to more than supply the wants of the city. The pipes were all flushed with this water, and all the valley water forced out, and thereafter until the epidemic ceased the whole city, with the exception of a small portion at the higher level in Nuuanu Valley, was supplied with water the source of which could not be contaminated. This protected water supply was a very important factor which contributed to the successful results.

CLEANSING THE CITY.

Squads of men were organized by the Marshal, who under the charge of officers and subject to the directions of the Med-

ical Inspectors, and accompanied by wagons conveying lime and disinfectants and carts and drays to take away rubbish, gave the city a cleansing it had never experienced before.

This work was vigorously prosecuted, and was subsequently supplemented by the work of the Citizens' Sanitary Committee.

"House cleaning day" is mentioned in Mr. Colburn's report. The regulations of the Board of September 19th, with the circular letter published by the sanitary committee also explain the objects of such house cleaning.

Other printed matter was prepared by the committee and the Board. One of the circulars prepared by the committee is appended to Mr. Colburn's report.

Large numbers of outline maps showing the boundaries of the infected districts were prepared by the committee and distributed throughout the community.

FORBIDDING THE USE OF FISH.

As soon as the physicians became satisfied that the water of the harbor and the fish were infected, stringent regulations were published forbidding the taking of fish from the sea, or and harbor, pond, river or stream between Makapuu Point on the east and Barber's Point on the west, and from the mountains to the sea. These regulations were a hardship upon many of the Hawaiians, who depend so largely upon fish for food, and many of whom obtain their livelihood as fishermen. And many Hawaiians depended very largely for their living upon the crabs, shell fish and sea weed obtained along the shore and in shoal waters. But notwithstanding notices published by the Board, the efforts of the press, and the personal efforts of citizens urging the people to eat nothing but food which had been cooked, it was found that the people were still eating fish and other products of the sea without being cooked.

The enforcement of these stringent regulations in regard to fish was another of the important steps in staying the progress of the disease.

FORBIDDING THE PEOPLE GATHERING IN LARGE NUMBERS.

After the disease became epidemic the gathering of large numbers of people in any one place in the district was forbidden. This regulation was extended to apply to church services and Sunday schools. The majority of the people of the community cheerfully submitted to this regulation as they did to all the others, but a few persons strongly opposed the closing of the churches. The regulation was enforced only while the epidemic was at its height, and was modified and finally rescinded as soon as it appeared safe to do so. An incident occurred in one of the churches, where a large congregation was assembled which emphasized the importance of such a regulation. A member of the congregation was taken suddenly ill with cholera and vomited before she could get out of church. And in more than one case of persons taken with cholera the vomiting and purging came on very suddenly almost without warning, and it was deemed unsafe to allow the people to gather in large numbers.

Another regulation, which was enforced, closed all liquor saloons from six o'clock p. m. till six o'clock a. m. each day. Evenings being the time when the saloons were most frequented, and the use of liquor abused the most. It is well known that the condition of the system produced by the excessive use of spirituous liquor renders it more susceptible to infection.

DISINFECTION AND FUMIGATION.

The most earnest efforts were made to prevent infection from clothing and other articles which had been infected or exposed to infection. Disinfectants of various kinds were used freely. Fumigation with sulphur fumes was thoroughly performed. In many cases the clothing and bedding were burned, and over thirty dwelling houses and out houses were also burned.

In each instance where property was destroyed a careful

record was sought to be kept of the nature and value of such property, and later the articles were either restored in kind or paid for. In cases of persons who were deprived of their homes in this manner, but who had not been sufficiently exposed to infection to necessitate their being quarantined, places of residence were furnished them.

In this connection it should be stated that the wants of all persons who had suffered in consequence of the regulations and acts of the Board were supplied so far as was practicable. During a portion of the time, when the epidemic prevailed from five hundred to one thousand persons were wholly supplied with food daily by the Board.

The disease appeared in over twenty separate localities, and more than forty dwelling houses in various parts of the city from Iwilei in the western suburbs to the Lunalilo Home on the eastern outskirts, and from above Judd street on the north to Kalia on the south, covering an area of not less than three miles in diameter. Guards had to be maintained by day and by night, at each of the infected localities. The wants of the people quarantined had to be supplied. This branch of the work was immediately under the charge of Marshal A. M. Brown, and was performed with an efficiency and fidelity which was most commendable. The police force under the Marshal's charge were most tireless and fearless in the performance of the arduous duties which devolved upon them during the entire prevalence of the epidemic.

When the epidemic had assumed larger proportions the military were called upon to perform guard duty at certain quarantined localities, and rendered great assistance.

REGULATIONS PERTAINING TO CARRYING FREIGHT TO OTHER PORTS.

This subject has been touched upon by Doctor Day in his report, hereto appended, but the Board desires to refer to the hearty cooperation of the several steamship companies. Wilder Steamship Company, the Inter-Island Steam Navi-

gation Company and the Oceanic Steamship Company cooperated to the fullest extent with the Board in the efforts to regulate traffic and enforce the regulations which had been imposed.

And the merchants of the city rendered invaluable service in their efforts to facilitate the enforcement of regulations, and at the same time to prevent suffering upon the other islands from the want of necessary supplies.

All of these parties suffered great loss and inconvenience and often their patience was very heavily taxed, but they were ever ready to assist by all means in their power.

CHOLERA HOSPITAL.

At the beginning of the outbreak and before the disease was deemed to be epidemic, each case was treated upon the premises where found.

Soon, however, it became apparent that a hospital was required.

The old immigration depot on the south side of the harbor was selected, and after thorough overhauling and cleansing was made available for the purpose. It was divided into three wards; one for the sick, one for convalescents and one for persons who had been exposed to infection, besides quarters for the medical staff and nurses.

Dr. Meyers' report treats of the plan pursued in the management of the hospital, and Dr. Emerson's report of the cases and their treatment.

THE HAWAIIAN RELIEF ASSOCIATION.

As the epidemic progressed, and the regulations of the Board were enforced many people, especially of the poorer classes of the Hawaiians became distressed for want of means for their support. The matter of seeking to obtain funds for their relief was undertaken by certain philanthropic citizens and a fund amounting to nearly eight thousand dollars was contributed by the merchants and others. This fund was placed at the disposal of a number of ladies, mainly Hawaiians, who

organized a Relief Association. Their headquarters were located on Bethel street, and branch offices in different localities. Food and clothing were furnished to large numbers of needy people for several weeks. The report of the treasurer published herewith gives the number of people thus relieved.

The work done by these self-sacrificing ladies saved a great deal of suffering. Among other beneficial results, it doubtless prevented persons from beaking the regulations prohibiting the use of fish. But for such relief some would have broken the regulations to satisfy their hunger.

THE WORK OF THE PRESS.

The valuable work done by the press of the city deserves notice in this report. The leading newspapers from the outbreak of the epidemic to its close gave their full support to the authorities, and sought in every way to prevent panic and to disseminate correct views, and to give only reliable information. The stand which they took doubtless contributed much to the calmness and courage which prevailed in the community. There were times when injudicious writing and sensational articles might have caused great injury.

PUBLIC INFORMATION GIVEN.

In order to acquaint the public official bulletins were published twice each day during the prevalence of the epidemic. The followings the form of the bulletins:

OFFICIAL CHOLERA BULLETIN.

Office of the Board of Health.

Honolulu,.....M.....1895.

NUMBER OF CASES—

Previously reported.....

For 24 hours ending midnight.....

New cases to date.....

Total, _____

REPORTED—

Soon after taken sick.....

When dying.....

After death.....

Total,

LIVING—

Completely recovered.....

In Hospital to date.....

DEATHS—

Previously reported

For 24 hours ending midnight...

Deaths to date.....

Total,

NATIONALITY—

Native Hawaiians.....

Part Hawaiian.....

Europeans

Chinese

Japanese

.....

Total,

.....

President Board of Health.

Public meetings of the Board were held. During much of the time such meetings were held daily, and at other times as occasion seemed to require. Special invitations were given to physicians to be present at such meetings.

Citizens of all classes attended and participated in the discussions. The conclusions arrived at by the Board were often influenced by these discussions.

COMMITTEES APPOINTED UPON THE OTHER ISLANDS

While every effort was made to prevent the disease from being taken to the other islands, the possibility of such efforts being ineffectual made it important that preparations be made to deal with the disease should it appear upon any of them.

In addition to the instructions to the physicians and Agents of the Board residing upon those islands a committee of seven members each, commissioned as Agents of the Board of Health, were appointed upon each of the islands of Hawaii, Maui, and Kauai to be Committees of the Board. These committees were instructed that they were charged with the carrying out of the regulations of the Board and had authority to take such measures as they deemed necessary to protect the health on their respective islands.

This step seemed advisable to insure harmony of action in the several districts of each island.

The measure was productive of good results, notwithstanding that in several instances there was some conflict of authority. The disease was confined to the district of Honolulu. Had it spread to the other islands the results might have been most disastrous. There were but few physicians on the other islands; the facilities for dealing with the disease, had it been introduced were very meagre; the supplies of water for domestic use were wholly of surface water; and the conditions were such that it would have been impossible to prevent the spread of the disease if it had appeared.

BURIAL OF THE DEAD.

As deaths from cholera began to occur in Honolulu the question of how to dispose of the remains of those who had died became a serious one.

It seemed undesirable to inter them in the cemeteries of the city. Moreover these cemeteries were already overcrowded. Great difficulty was met in seeking for a suitable place in which to make these burials.

Cremation was proposed. This method has much to commend it for general purposes, and especially so for the disposition of the bodies of those who have died from contagious or infectious diseases. But there were no facilities for cremating, and moreover great prejudice existed against the method.

Burial at sea at a long distance from shore was also proposed, but in view of the opposition raised to such plan it was abandoned.

Quite a number of burials were made at the foot of Punch-bowl hill at a place inland from the Makiki cemetery. Later a spot was chosen beyond Moanalua beyond the western limits of the city, and a large number were buried there.

The matter of the necessity for providing new and larger cemetery accommodations for the city of Honolulu is referred to in the general report of the Board of Health.

DISINFECTING AND FUMIGATING PLANTS.

During the progress of the epidemic, and with the new arrivals of steamships from Japan, the importance of having better facilities for dealing with cargoes and the effects of passengers from infected ports was forced upon the attention of the Board.

Fortunately the Board was in possession of plans and specifications of the modern disinfecting and fumigating plants now in use at some of the ports in the United States. These plans and specifications had been procured by Doctor Day during a recent visit to the United States.

Steps were taken for the procuring and erection of such plants here, and although the epidemic happily terminated before the plants were erected, they have now been obtained, and we are supplied with the most modern appliances for fumigating and disinfecting freight and baggage.

By means of the fumigating plant sulphur fumes can be forced into a compartment where freight is placed to be fumigated, or into the hold of a ship and in such quantities and under such pressure that the fumigation will be most thorough.

With the disinfecting plant super-heated steam and air is used under perfect control so that the most delicate fabrics can be disinfected without injury.

With increasing commerce and more rapid means of communication and transportation, the danger of exposure to contagious and infectious diseases will constantly become greater.

Our protection in the future from these dangers must lie in our vigilance and facilities for dealing with such diseases should they appear.

SEWERAGE AND DISPOSITION OF REFUSE MATTER

While this subject has been before the community for many years and efforts have been made to solve the problem of how best to dispose of the sewerage and waste matter of the city, attention was most forcibly called to it during the recent epidemic.

As the Government is giving attention to the subject and will present a report upon the same to the Legislature the matter will not be dwelt upon in this report. It is proper, however, to say that the Board of Health deem it of the utmost importance that better means should be provided for the disposition of such material than has heretofore existed in Honolulu.

EXPENSES.

The total cost of suppressing the epidemic amounted to \$61,697.55

This includes the pay of employees, hospital expenses, transportation, supplies, burial of the dead, food and clothing, damages for buildings and effects destroyed, crops of taro and rice destroyed, buildings erected for the accommodation of persons who were removed from infected localities, the cost of fumigating and disinfecting plants, and all incidental expenses.

Great care was sought to be exercised and accurate accounts kept of all transactions.

Among the expenses was the pay of patrol guards mounted and on foot, and boats in the harbor and in Nuuanu stream. The volunteer guard duty performed by large numbers of the citizens in the city and in the adjacent districts of the island, was supplementary to the service of the paid guards and employees.

REFUSAL TO CARRY MAILS.

It is proper that attention should be called to the fact that several foreign steamships engaged in the trade between Honolulu and foreign ports refused to take mails from this port while cholera prevailed here. This refusal was persisted in upon several occasions notwithstanding the urgent representations of the great importance of our being able to communicate with foreign ports and of the masters of such ships being informed that all mail matter was subjected to thorough fumigation.

Such refusal was a very serious matter. At the time it was impossible to foretell how long the epidemic would prevail or to what limits it might extend. In view of our insular and isolated position without cable communication, infrequent steam communication and limited supply of disinfectants the situation was very serious. Under the circumstances the refusal to carry mails appeared to be inhuman and very wrong.

RESULTS ACHIEVED.

Thirty days from the time that the disease appeared in the city the epidemic was at an end.

Thereafter but three sporadic cases appeared.

The conditions under which this result was achieved are deserving of special notice.

The population of the city was made up of five distinct classes; native Hawaiians, Chinese, Japanese, Portuguese and other Europeans.

Each nationality had its peculiar views and prejudices.

At first the Hawaiians concealed the cases that appeared

among them. This was partly from disinclination to have their friends removed from home and themselves subjected to quarantine. The same disinclination and concealment has been experienced in former years during epidemics of small-pox. Upon this occasion their disinclination to report cases of sickness was aggravated by false reports and pernicious advice of mischievous persons.

The native Hawaiians among whom the disease chiefly prevailed are accustomed to eat uncooked food, fish and water. And notwithstanding the fatal results, and regardless of advice and instructions, many of them continued to eat such uncooked articles.

Added to this some persons, chiefly foreigners, persisted in maintaining that the disease was not cholera. The effect of such opinions expressed in public and in private were very injurious.

The appearance of the disease was sudden and unexpected, and the community had had no experience with cholera.

We were cut off from the rest of the world and had nowhere else to look for help.

The climatic and other conditions were favorable to the propagation of the disease. And many other circumstances conspired to render the situation extremely difficult to deal with.

As the disease became scattered over the city and appeared in localities widely separated there was great reason to fear that the epidemic would become general, spread to the other islands and become endemic.

A minute and detailed statement of all the measures taken which contributed to the successful results attained would exceed the limits of this report. But enough has been stated to show the general plan and methods pursued.

It may be proper to add that there are some who still maintain that the disease was not Asiatic cholera. One reason being the very fact that the epidemic was so soon stamped out. Had the work done been less efficient and the results more disastrous their conclusions might have been different.

NATURE OF THE DISEASE.

Upon request, one of the physicians of the Board has prepared the following statement as to the nature of the disease.

The late epidemic has been called, ptomaine poisoning. This is perfectly correct. Asiatic cholera is a form of ptomaine poisoning.

A ptomaine is a chemical compound, basic in character (in other words, an alkaloid) formed by the action of bacteria upon organic matter.

Ptomaines are as a rule violent poisons, but not invariably so. Some are quite harmless.

As bacteria differ from each other, so the alkaloids formed by them differ. Other conditions also alter the nature of these substances, viz: the kind of material acted upon, the conditions under which the decomposition takes place and also probably the health of the individual when the decomposition takes place in the human body.

When certain bacteria are introduced into the human system, if they find their new environment favorable to their existence and development, they multiply with marvelous rapidity obtaining their sustenance from the materials around them. A product of this development is a peculiar ptomaine. When sufficient of this ptomaine has been manufactured and absorbed by the individual whose body has been invaded disease results. The nature of the resulting disease depends upon the character of the ptomaine, as the nature of the ptomaine depends upon the character of the bacteria which manufactures it.

The comma bacillus of Koch produces its own specific kind of ptomaine in the human intestines, and the absorption of this ptomaine (a violent poison) causes the train of symptoms which go to make up the disease which is known as Asiatic or epidemic cholera.

The comma bacillus has been known and studied only since its discovery by Prof. Koch in 1884, but the sickness produced by it, Asiatic cholera, has been known for ages.

An epidemic of Asiatic cholera cannot be mistaken. Individual cases, taken by themselves, might be confounded with other forms of gastro-intestinal disturbances—notably cholera-morbus (called also cholera nostra) or with some other sickness produced by a different ptomaine. But this is only possible in sporadic cases. Epidemic cholera after it has obtained full swing, presents a clinical picture so characteristic that there is no mistaking it, even without the aid of the microscope and culture experiments. Culture experiments are only useful at the beginning of an outbreak, or in doubtful cases, at which time they are of the greatest importance, enabling us as they do to arrive at a definite diagnosis in the very earliest cases and making it possible, as was the case in our own epidemic to check the fearful scourge before it passes beyond control.

The physicians of the Board of Health realizing at the very outset the gravity of the situation, early instituted culture experiments with the discharges obtained from the first cases of suspicious sickness which appeared in Honolulu. The evidence furnished by these experiments was conclusive. We were thus enabled to arrive at a positive diagnosis of Asiatic cholera after the appearance of the fourth case.

The responsibility resting upon a Board of Health at the time of the introduction of an epidemic into any country is a tremendous one. Upon the promptness with which the situation is grasped and the thoroughness with which the first steps are taken depend the lives of thousands of innocent persons. An epidemic like cholera will destroy more human beings in one month than civil war will destroy in a year.

The negligence and concealment of the nature of the sickness by the health authorities at the outbreak of cholera in Europe in 1884 was largely to blame for the fearful devastation which followed.

The Russian authorities were condemned by the medical press of the world. It was entirely due to the negligence of the local health authorities that cholera obtained such a start in the city of Hamburg. In striking contrast to this was the

promptness with which it was suppressed in London and in New York, into both of which cities it was introduced shortly after.

SERVICES OF THE PHYSICIANS.

In closing this report I desire to refer especially to the services rendered this community and to the whole country by the physicians, who assisted and who were the medical advisers of the Board of Health during the period of the cholera epidemic.

The following is the list of their names:

Doctor F. R. Day,
 Doctor C. B. Wood,
 Doctor N. B. Emerson,
 Doctor R. P. Myers,
 Doctor George Herbert,
 Doctor H. W. Howard,
 Doctor J. T. Wayson,
 Doctor J. K. Smith,
 Doctor C. T. Rogers,
 Doctor C. C. Ryder,
 Doctor C. B. Cooper.

With keenness of perception, trained ability, and indomitable energy they grasped the situation and waged what appeared to be a most unequal battle. Without hesitation or delay they applied themselves to the work and by night and day devoted their energies to the task. To no one thing can the successful results be more attributed than to the wise advice and intelligent and ceaseless work of these physicians.

Respectfully submitted,

WILLIAM O. SMITH,

President of the Board of Health.

Honolulu, January 23, 1896.

REGULATIONS OF THE BOARD OF HEALTH.

HEALTH NOTICE.

The Board of Health has directed its agents to make a special inspection of houses and premises in the city of Honolulu, with a view of placing the same in a good sanitary condition, and the public are therefore requested:

1. To render all assistance to the agents of the Board.
2. To obey the instructions of the health agents.
3. To put drains, cesspools, privy-vaults and other receptacles of refuse in good sanitary condition.
4. To have all garbage and other decaying refuse promptly removed and all sources of noxious smell disinfected. Chloride of lime is as cheap as well as good disinfectant. Carbolic acid is also an effective purifier—three table spoonfuls to a gallon of hot water, well stirred.

WILLIAM O. SMITH,
President Board of Health.

Office of the Board of Health.
Honolulu, Aug. 21, 1895.

REGULATIONS OF THE BOARD OF HEALTH.

1. From and after this date all persons are forbidden to use any water from the Nuuanu stream, or Honolulu harbor, or from bathing in said stream or harbor, from throwing anything, liquid or solid, into said stream or harbor, or permitting any liquid or drainage flowing into said stream or harbor.

2. The sale, in the District of Honolulu, of fish, shell-fish or any product of the sea is prohibited.

3. Until further orders no passengers or freight will be allowed to be conveyed from the island of Oahu to any other island of the group.

4. No letters or mail matter shall be taken from the island of Oahu to any other island of the group, excepting from the

General Postoffice in mail bags; no mail matter shall be allowed to leave the post office until thoroughly fumigated.

5. The manufacture of poi is prohibited in that portion of Honolulu bounded by Nuuanu street on the east, Judd street on the north, the sea on the south, and on the west by a line drawn from the corner of Judd and Liliha streets, down Liliha street to the sea.

By order of the Board of Health,

WILLIAM O. SMITH,

President Board of Health.

Honolulu, August 30, 1895.

REGULATIONS OF THE BOARD OF HEALTH.

1. No persons are allowed to go from the district of Honolulu to any other district of the island of Oahu without a permit from the Board of Health.

2. No freight or baggage shall be taken from the district of Honolulu to any other district of Oahu without a permit from the Board of Health.

3. No schools, public or private, on the island of Oahu, will be allowed to open until further order of the Board.

4. Church and Sunday school services on Sunday, September 1st, in the city of Honolulu are prohibited.

By order of the Board of Health,

WILLIAM O. SMITH,

President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,

Honolulu, September 2, 1895.

While physicians employed by the Board of Health are in attendance at the cholera hospital to care for the patients, every patient may have any other licensed physician whom he chooses to attend upon him.

WILLIAM O. SMITH,

President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., September 3, 1895.

1.—Taking of fish, shell-fish or any product of the sea or water, from the sea or any harbor, pond, river or stream, between Makapuu Point and Kalaeloa (Barber's Point) and from the mountains to the sea, is strictly prohibited.

2.—All saloons and places where spirituous liquor is sold in the district of Honolulu, are ordered to be closed from six o'clock p. m. till six o'clock a. m. each day.

By order of the Board of Health,
WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, September 4th, 1895.

The gathering of large numbers of people in any one place in the district of Honolulu is forbidden. This regulation applies to church services, band concerts and all other places where people are wont to meet in large numbers.

By order of the Board of Health,
WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., September 5, 1895.

All letters, newspapers, and mail matter for persons in quarantine on the vessels anchored outside the harbor should be sent through the post office, where they will be fumigated.

No other mail matter will be allowed to be taken on board such vessels.

Letters from the vessels will be delivered through the post office.

Public meetings of the Board of Health will be held daily at the office of the Board, at 3 p. m.

WILLIAM O. SMITH,
President Board of Health.

PRECAUTIONS AGAINST CHOLERA.

Eat nothing which has not been thoroughly cooked. Dried fish or salmon should be cooked before eating. Drink no water unless it is first boiled.

Tea and coffee are good because they are boiled. Keep all food and water covered. If the food or water remains uncovered it may become infected.

If food or water stands uncovered flies will have access to it. Flies may carry infection.

The hands should be kept clean. They should be washed frequently with soap.

Persons who go barefooted should wash their feet frequently.

The symptoms of cholera are vomiting, purging, pain in the bowels, and cramps in the arms and legs. Any one having any of these symptoms should send for a doctor at once.

If the disease is treated when it first begins many will recover. If not attended to at once there is little chance of recovery.

At the cholera hospital the patients may have any licensed physician they wish.

The doctors say that if every person in Honolulu would, from this time, eat nothing but food which has been thoroughly cooked, and water which has been boiled, and every one

would keep his hands clean, after a few days there would not be another case of cholera here.

Office of the Board of Health, Honolulu, Sept. 5, 1895.

REGULATIONS OF THE BOARD OF HEALTH.

The following regulations have been adopted by the Board of Health in regard to the sending of freight and permitting passengers to go from Honolulu to the other islands:

First:—The steamers W. G. Hall and Kilauea Hou having had no direct communication with Honolulu, for a period of time longer than incubation of cholera, may be considered clean. These ships shall, however, be disinfected by fumigating the holds and enclosed spaces with sulphur dioxide, and washing the decks, deck houses, bulwarks, etc., with a 1 to 1000 solution of bi-chloride of mercury. The crews in the meantime are to be removed to quarantine island, there to bathe in carbolic acid solution and change their clothing to those that have been cleansed by boiling or fumigation. After returning to the ships they are to be anchored outside of the harbor, and from there allowed to depart with such passengers and freight as the Board of Health may permit.

Second:—Such other inter-island steamers as the respective companies designate, may be disinfected in the same manner, and their crews disinfected as those of the W. G. Hall and the Kilauea Hou. They are then to anchor outside the harbor for a period of five days and if no sickness of a contagious nature has developed on board during that period they may be allowed to depart after inspection by an agent of the Board of Health with such cargo and passengers as the Board of Health shall permit.

All disinfecting and inspecting to be done by or under the supervision of an agent of the Board of Health. An officer of the Board of Health will be kept on the steamers while in quarantine, at the steamer's expense.

Third:—All the first cabin passengers who will have their

baggage fumigated, bathe in carbolic acid solution and then enter a five days' quarantine on board their respective steamers lying outside, may be allowed to depart at the end of five days, after passing a satisfactory inspection by an agent of the Board.

Fourth:—Until further order, no freight will be allowed to be taken from Honolulu for any other port of these islands excepting flour, rice, hay, grain, coal in bulk and coin which has been disinfected, excepting only upon special permission in writing from the Board.

Fifth:—No freight will be allowed to be shipped from Honolulu for any other ports in these islands, except from the Inter-Island wharf. An officer of the Board will be stationed at that wharf to supervise all freight, and his orders must be obeyed.

Sixth:—All passengers desiring to depart from Honolulu for any other port under the above conditions will please report at once at the office of the Board of Health, where their names may be registered and instructions given.

By order of the Board of Health,

WILLIAM O. SMITH,

President.

Honolulu, Sept. 4, 1895.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., September 5, 1895.

No person is allowed to enter the following valleys and localities in and about Honolulu, without a permit from the Board of Health, namely:

Palolo Valley.

Manoa Valley.

Pauoa Valley, above the road leading from Nuuanu street to Punchbowl street.

Nuuanu Valley, above Judd street, and that portion lying

between Nuuanu street and the stream mauka of the bridge at Niupaipai.

Kalihi Valley, mauka of King street.

Moanalua Valley.

Provided, however, that these regulations do not apply to bona fide residents of those valleys and localities.

WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., September 7, 1895.

No steamer, sailing vessel, or boat of any description shall leave the port of Honolulu for any other port of these islands without a permit from the Board of Health.

No steamer, sailing vessel or boat of any description shall leave the island of Oahu for any other island of the group without a permit from the Board of Health.

WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Honolulu, September 9, 1895.

No person shall change his place of abode in the district of Honolulu without a permit from the Board of Health.

By order of the Board of Health,

WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, September 9, 1895.

The district of Kona, for sanitary purposes is hereby divided into twenty-one districts, numbered from one to twenty-one respectively. The districts are bounded as follows:

1st District.

Boundary: Makai of King street from road at terminal of tramways to Nuuanu stream.

2d District.

Boundary: Mauka of King street from Kamehameha School to Liliha street.

3d District.

Boundary: King street to School street, Liliha street to Nuuanu avenue.

4th District.

Boundary: East of Nuuanu avenue, mauka of Beretania street, west of Alapai street, east of an extension of Emma street, up Punchbowl, makai of School street.

5th District.

Boundary: Makai of Hotel street, from Nuuanu avenue to the stream.

6th District.

Boundary: Makai of Beretania street, from Nuuanu avenue to Alakea street.

7th District.

Boundary: Beretania street to Queen street, Alakea street to Punchbowl street.

8th District.

Boundary: Queen street to sea, Alakea street to Old Plantation.

9th District.

Boundary: Punchbowl street to Waikiki road, makai of Beretania street.

10th District.

Boundary: From junction of Waikiki road and King street all makai of Beretania street, including Moiliili and Waikiki.

11th District.

Boundary: Waialae and all beyond Diamond Head and Telegraph Hill.

12th District.

Palolo Valley.

13th District.

Boundary: Mauka of Beretania street, east of Punahou street, including Manoa Valley.

14th District.

Boundary: Mauka of Beretania street, from Punahou street to Alapai street.

15th District.

Boundary: Pauoa Valley, mauka of School and Punchbowl streets.

16th District.

Boundary: Nuuanu Valley, mauka of Pauoa Road and Judd street.

17th District.

Boundary: School street to Judd street, Nuuanu avenue to Liliha street.

18th District.

Boundary: Kalihi, beyond Kamehameha School, mauka and makai.

19th District.

All of Moanalua.

20th District.

Boundary: From School street to Pauoa road and extension of same up Punchbowl, and from Nuuanu avenue to an extension of Emma street, up Punchbowl.

21st District.

Boundary: Beretania street to Hotel street, Nuuanu avenue to stream.

WILLIAM O. SMITH,
President Board of Health.

NOTICE OF PUBLIC MEETING.

Office of the Board of Health,
Honolulu, September 18, 1895.

A public meeting of the Board of Health will be held **THIS DAY**, at 3 p. m., in the old Legislative Hall, to discuss the proposition to cleanse all dwelling houses in the district of Honolulu.

A general invitation is given to all persons to attend.

WILLIAM O. SMITH,
President Board of Health.

NOTICE TO SHIPPERS OF FREIGHT.

Office of the Board of Health,
Honolulu, H. I., Sept., 19, 1895.

Until further notice, excepting upon special permit, no freight will be allowed to be shipped from Honolulu, to other ports of these islands, from any other wharf than the Pacific Mail wharf.

Freight shipped from the Pacific Mail wharf will be only merchandise from foreign ports which has been held in strict quarantine.

WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

INFECTED DISTRICTS.

The following portions of the districts of Kona, Oahu, are declared infected districts:

First. All of the territory lying makai of King street to the sea, and east of Kalihi stream to the harbor, excepting the Kamehameha Girls' School premises.

Second. All of the territory lying:

1. East of the line of the road running mauka from King street on the Waikiki side of the Kamehameha School premises.

2. Mauka of King street.

3. West of Liliha street, and

4. Makai of the line of extension of School street.

Third. All of the territory lying:

1. East of Liliha street.

2. Mauka of King street, from Liliha street to King street bridge.

3. West of the Nuuanu stream, from King street to Beretania street.

4. Mauka of Beretania street, from Smith's bridge to Nuuanu street.

5. West of Nuuanu street, from Beretania street to Kukui street.

6. Makai of the line of the extension of Kukui street, from Nuuanu street to the Nuuanu stream.

7. West of the Nuuanu stream, from the point of conjunction with the extension of Kukui street to School street.

8. Makai of School street, from the Nuuanu stream to Liliha street, excepting the St. Louis College premises.

Fourth. All that territory lying between Beretania street and the sea, and from Nuuanu street west to the Nuuanu stream.

Fifth. All that territory lying:

1. Mauka of School street, from Fort street to Punchbowl street.

2. East of the line of the extension of Fort street.

3. West of Punchbowl street, from School street to Sylva's nursery.

4. Makai of a line drawn in extension of Sylva's makai fence to the point of intersection of the extension of Fort street.

Sixth. All that territory lying east of Punchbowl street to Sheridan street and makai of Queen street and the line of extension thereof, from Punchbowl street to Sheridan street; and also all buildings on or adjacent to the lower end of Sheridan street.

REGULATIONS FOR UNINFECTED DISTRICTS.

All clothing and articles made from cloth, now or heretofore in use, not newly washed, and all beds and bedding, now or heretofore in use, in the district of Kona, Oahu, in those portions not named as infected districts, are hereby ordered to be thoroughly sunned and aired by the owners or those in control of same for at least eight hours of sunshine and dry weather. All houses in said uninfected districts to be thoroughly cleaned and aired, and, where necessary, disinfected by those in possession and control of same.

REGULATIONS FOR INFECTED DISTRICTS.

In the said infected districts, all clothing and other articles made from cloth, not newly washed, now or heretofore in use, which will not be injured by boiling, shall be thoroughly boiled and sunned until completely dry. All other clothing or articles made from cloth, now or heretofore in use, including all beds and bedding, and also all carpets, mats and rugs shall be taken out, cleaned and thereafter sunned and aired for at least eight hours of sunshine and dry weather. All unpainted walls, wood floors and interiors to be whitewashed or disinfected. All painted floors and interior walls, door and window casings and veranda rails to be washed with a disinfecting solution.

CONTROL OF BOARD OF HEALTH.

All work prescribed under this order, for both infected and uninfected districts, shall be begun not later than 8 a. m. Monday, September 23rd, 1895, and continued until completed. Said work shall be done to the satisfaction of the Board of Health, and shall be subject to the inspection and control of its agents, who shall have the authority to name the disinfecting solutions and other materials to be used, and direct the application thereof.

By order of the Board of Health,

WILLIAM O. SMITH,
President Board of Health.

Honolulu, Sept. 19, 1895.

CIRCULAR LETTER FROM THE SANITARY COMMITTEE TO THE RESIDENTS OF THE DISTRICTS OF KONA, OAHU.

In connection with the above order of the Board of Health, the Sanitary Committee begs to make the following suggestions and explanations:

Our medical authorities are agreed that clothing, whether clean or not, is peculiarly adapted to carry and preserve the cholera germ, particularly if at all damp or musty. Experience has further taught that the best regulated households cannot be considered exempt from the possibility of harboring the disease, as the germ has been known to be carried into houses in ways unaffected by the sanitary conditions of the same; for instance, upon produce, upon shoes, upon the feet, hands and clothing of servants, etc.; occurrences, any one of which might happen where sanitary conditions have been irreproachable.

Aside from the question of life and death involved in this struggle, remember that one case of cholera is sufficient to shut Honolulu off from communication and trade with the outer world, and the other islands, and as effectually as if there were a hundred cases. One case will be sufficient to paralyze business, and bring want to thousands, none too well provided for, even when commerce is wholly unhampered.

Under such circumstances, the personal responsibility upon every individual resident in this district to do his or her best to stamp out this disease for good and all cannot be overestimated. The reader should bear in mind that the extinction of the present epidemic is not more important than the prevention of its recurrence hereafter through dormant germs now unquestionably still in this city.

We therefore take the liberty of making the following recommendations:

(1) The suspension of business on Monday next, as far as practicable, without deduction from wages of regular employees therefor.

(2) In connection with the cleaning and airing of clothing, bear in mind that our medical authorities state that the cholera germ cannot survive more than four hours of direct sunshine or more than twenty-four hours of exposure to absolutely dry air; therefore in airing and sunning clothing remember to turn the same at intervals, say every two hours or so. Also turn clothing inside out, so that the entire surface of the clothing will have the benefit of direct sunshine.

(3) It would be well, on Monday morning next to dress throughout in clothing recently washed or known to have been wholly unexposed to possible contagion.

(4) The cleaning and airing of houses called for by the order of the Board of Health is a most important part of the work and cannot be done too thoroughly, especially where there are moist and damp spots, stables, carriage houses and all other out-houses should be included in the cleaning.

(5) While the order of the Board of Health does not call for the removal of any of the furniture, yet wherever practicable we recommend that it be done.

(6) In the infected districts, we suggest two hours as the limit for boiling clothing, then thoroughly dry the same in the sun, so that no dampness whatever remains, when the clothing is put away. The Board of Health in these districts will have agents to conduct the disinfecting and whitewashing, and will further provide the whitewash and disinfectants to be used. It is expected, however, that the occupants of premises that are being disinfected and whitewashed will render whatever assistance they can in the way of removing furniture and obstructions, or otherwise.

(7) All damp and unsanitary spots in yards, lanes and streets should be disinfected by those responsible for or living near the same. In infected districts disinfectants for this purpose will be furnished by the Board of Health. Anyone in the uninfected districts needing disinfectants and unable to purchase them will be supplied with the same upon application, by the Board of Health, free of charge.

THE SANITARY COMMITTEE.

For the purpose of general house cleaning, no business will be transacted at any of the Government Offices in the city of Honolulu on MONDAY, September 23d, and the same will be closed during the day.

J. A. KING,
Minister of the Interior.

Interior Office, Sept. 20, 1895.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, September 20, 1895.

The regulation of the Board of Health prohibiting the holding of public meetings in the district of Honolulu, is modified to the extent of permitting church services and band concerts, to be held in the day time.

WILLIAM O. SMITH,
President Board of Health.

Office of the Board of Health,
Honolulu, H. I., October 3, 1895.

The regulation of the Board of Health of September 4, 1895, forbidding the holding of meetings in the district of Honolulu, has this day been rescinded.

By order of the Board of Health,
WILLIAM O. SMITH,
President.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., October 3, 1895.

Schools may be opened in the district of Honolulu except the schools situated in the infected locality.

No children from the infected locality are allowed admission to any school—the “infected locality” is that portion of the district lying within the following boundaries, namely:

From the harbor along Maunakea street to Beretania street, along Beretania street to Nuuanu street, along Nuuanu street to Vineyard street, along Vineyard street to Nuuanu stream, along Nuuanu stream and Puehuehu stream to Judd street, along Judd street west to the foot-hills, along the base of the foot-hills to the road bounding the Kamehameha School premises on the east, thence a line drawn in extension of said road to the sea.

WILLIAM O. SMITH,
President Board of Health.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H I., October 5, 1895.

No merchandise shall be allowed to be shipped from Honolulu to other ports of these islands excepting under the following regulations:

No goods of any kind shall be shipped unless they are new and in merchantable condition.

All duly licensed business houses may ship the following described goods, imported from American, European and Australian ports:

WITHOUT PERMIT.

Agricultural implements	Cement
Bags, new, in bales	Coal, in bulk
Bricks	Corrugated iron
Carriages and wagons	Fence wire
Doors and windows	Flour
Fertilizers	Hay
Grain	Iron and steel
Ice, packed	Lime
Iron pipe	Machinery
Lumber	Oil, in barrels or drums
Nails	Plows
Plaster	Powder
Potatoes	Rope in coils
Rice	Shingles
Stoves	Sewing machines

ON SPECIAL PERMITS.

Aerated waters (of local manufacture)
 Coal in bags
 Medical supplies

GOODS FROM CHINA AND JAPAN.

All new goods from ports in China and Japan may be shipped excepting liquors, groceries, provisions and other articles of food.

Provided, however, that the following goods may be shipped, namely:

Beans (dried), usually packed in 50 or 100 lb. bags.
 Bean stick
 Bamboo sprouts, hermetically sealed in 2 lb. cans
 Ginger, preserved in jars
 Shrimps, dried, California only
 Peanut oil
 Tea
 Sam Shoo
 Vermicelli

NOT TO BE ALLOWED.

No second-hand clothing, bedding, furniture, trunks, or other personal effects to be allowed shipment.

No case, or package requiring a permit shall be received on board of any vessel, unless the same has an inspector's label pasted on it, giving the name of the shipper and signed by the inspector.

By order of the Board of Health,
 WILLIAM O. SMITH,
 President Board of Health.

Office of the Board of Health,
 Honolulu, October 7, 1895.

The regulation of the Board of Health requiring that liquor saloons be closed from six p. m. to six a. m. is hereby rescinded.

By order of the Board of Health,
 WILLIAM O. SMITH,
 President.

Office of the Board of Health,
Honolulu, H. I., October 9, 1895.

The regulation of the Board of Health of September 5th, forbidding any person to enter the valleys of Palolo, Manoa, Pauoa, Nuuanu and Kalihi without a permit, has this day been rescinded.

By order of the Board of Health,
WILLIAM O. SMITH,
President.

REGULATIONS OF THE BOARD OF HEALTH.

Office of the Board of Health,
Honolulu, H. I., October 11, 1895.

The taking of fish, shell fish or any product of the sea or water of any pond, stream, creek, inlet, bay or harbor, or upon the sea to a distance of two miles from the shore, between Diamond Head and Ahua Point, in the district of Kona, island of Oahu, and from the mountains to the sea, is strictly prohibited.

The sale of fish and all products of the sea is prohibited in the district of Honolulu, excepting at the new market building, where scale fish, clams and lobsters from the waters outside of the above limits may be exposed for sale under the supervision of inspectors appointed by the Board of Health.

Oysters from Pearl Harbor may be sold elsewhere under special permit.

Such inspectors shall have the power to seize, condemn and destroy any fish or product of the sea exposed for sale, or brought to the market, which they shall have reason to believe was taken from the locality prohibited by these regulations, or which shall appear to be unfit for food.

The regulation of the Board of Health relating to the taking and sale of fish in the said district of Kona, dated September 3, 1895, is hereby rescinded.

By order of the Board of Health,
WILLIAM O. SMITH,
President.

Office of the Board of Health,
Honolulu, H. I., October 16, 1895.

The regulation of the Board of Health relating to the quarantining of island vessels at the port of Honolulu has been rescinded.

The regulation forbidding the making of poi in that portion of Honolulu lying between the Nuuanu stream and Liliha street has also been rescinded.

By order of the Board of Health,
WILLIAM O. SMITH,
President.

REPORT OF DR. F. R. DAY, PORT PHYSICIAN.

W. O. SMITH, Esq.,
President of Board of Health.

I herewith submit the report of the port physician for the port of Honolulu for the period ending December 31, 1895.

Respectfully yours,
F. R. DAY, M. D.
Port Physician.

Honolulu, December 31, 1895.

From Sept. 1, 1894 to Dec. 31, 1895, I have boarded steamships 109 times and sailing vessels 3 times, the latter sailed from Hong Kong.

I boarded the regular steamships of the

Oceanic S. S. Co.....	48	times
Canadian-Australian S. S. Co.....	27	"
Pacific Mail S. S. Co.....	14	"
Oriental & Occidental S. S. Co.....	13	"
Oregon Railway & Steam Navigation Co.....	5	"
Tramp steamers.....	5	"

They hailed from the following ports:

San Francisco	48
Victoria, B. C.....	14
Apia, Samoa	14
Suva, Fiji	14
Yokohama	17
Kobe	2
Astoria	2
Valparaiso	1

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An epidemic of the Plague raged in Hong Kong during the summer of 1894, and the Dengue was epidemic in Samoa in January, 1895. Neither of these diseases reached our shores.

An epidemic of Asiatic cholera was reported in Japan in July, 1895. The first news of it was brought to Honolulu by the P. M. S. S. "City of Peking" on July 17, 1895, 11 days out from Yokohama.

R. W. Irwin, Hawaiian Minister, resident at Yokohama wrote on the bill of health as follows:

"One case of cholera only has been reported in Yokohama on July 4. None previously. Five cases of cholera reported 20 miles from Yokohama. Ten cases daily from June 15 to July 1 in Tokio. 20 cases daily from July 1 to July 4, and 27 cases on July 4 all in Tokio. In the south * * * it is epidemic and increasing. Altogether officially reported from the beginning of the outbreak until July 4 there have been 3,997 cases of cholera in all Japan." Dated July 6, 1895.

On the ninth of August the O. & O. S. S. "Belgie" arrived at Honolulu 11 days from Yokohama with 5 cabin, 3 European steerage, 34 Japanese and 505 Chinese passengers for this port. R. W. Irwin, Hawaiian Minister, resident at Yokohama reported on the bill of health as follows:

"Altogether there have been twenty cases of cholera in Yokohama up to July 25, midnight. There was not one case reported up to midnight of July 26. In the whole prefecture of Kanagawa there were (in addition to Yokohama) a total of 33 cases up to July 25 from the beginning of the outbreak.

In the whole empire during the same period (including Yokohama and Kanagawa Prefecture) 9,625 cases (including 1,062 on army transports) with 5,874 deaths have been officially reported. The Japanese Government has not declared Yokohama an infected port and with so few cases I do not consider cholera is as yet epidemic in Yokohama.

"The Japanese Government is very strict and every case of cholera is reported. No doubt sometimes cases of ordinary cholera or cholera morbus have been officially reported as Asiatic cholera."

There had been three deaths on the voyage amongst the Chinese steerage passengers, one on the seventh day out from Yokohama and two on the day before arrival at Honolulu.

These deaths were entered in the official log as due, one to pneumonia and two to heart disease. The ship's surgeon, Dr. R. I. Bowie, who embalmed the bodies, gave his testimony as to the cause of death.

Captain W. H. Walker signed the health certificate making a declaration that there had been no disease of a contagious nature on board during the voyage.

On inspecting the Chinese passengers I found one sick man but could discover in him no evidence of a suspicious character. The ship's surgeon reported that he had been ailing with fever for a day or two.

The Chinese had no communication with the shore at Yokohama, Kobe or Nagasaki.

There was no sickness amongst the Japanese on the voyage.

I gave these facts careful consideration and came to the conclusion that cholera could not have caused the death of the three Chinese and the sickness of the man I examined.

If it were cholera how was it possible in such a crowded steerage for the disease to have been limited to four cases?

The immunity of the Japanese who came from the cholera districts, and the infection of the Chinese who had not been exposed at any of the Japanese ports was hard to explain. The action of the ship's surgeon in embalming the bodies was incompatible with the idea that they died of cholera.

I therefore ordered the steerage passengers to be landed in quarantine as usual.

They were taken to the quarantine station on Saturday, August 10. On the scow which was transferring them the sick man was taken with vomiting and purging. Mr. J. D. McVeigh, the efficient agent of the Board of Health at the quarantine station, had him promptly isolated, with a Chinese lad who had been his attendant.

The following day, August 11, the sick man died and was buried in the graveyard at the quarantine grounds. On the same day, August 11, two other Chinese were taken violently sick with vomiting and purging. They were promptly isolated.

Monday evening, August 12, the Chinese lad who had been nursing the first sick man was stricken with the same symptoms of vomiting and purging. He also suffered from severe abdominal pains, cramps in the legs, profound prostration, very cold surface, rapid emaciation, and he died in collapse Tuesday morning after a sickness of 14 hours.

I was first notified of sickness at the quarantine station shortly before noon on Tuesday and by the time I arrived at the station, 1:30 p. m., the dead lad had been buried.

Mr. McVeigh gave me the foregoing account of his symptoms. On inquiring as to the nature of the discharges, Mr. McVeigh said they looked in all of the cases like thin molasses. I made a special effort without asking leading questions to get a description of the "rice-water" discharge, but the answer was always the same: "They were dark like molasses."

The other two Chinese were convalescent when I saw them, the vomiting and purging having stopped during the night. One of them made a rapid recovery, but the other, an old man, became comatose Wednesday night and died in that condition Thursday afternoon without any return of diarrhoeaic symptoms. Dr. R. P. Myers saw this man with me on Thursday morning and gave it as his opinion that he had at that time no symptoms of cholera. In the light of cases that occurred on shore it is reasonable to suppose that this man died of suppression of the urine.

On Wednesday I had the body of the Chinese lad exhumed and made a post mortem examination about 27 hours after death. The body was emaciated, the skin of a dusky hue, the fingers shrivelled, features pinched and abdomen distended.

On opening the abdomen the stomach and intestines were found distended. Their peritoneal surfaces were smooth and shining, with many minute injected spots the vessels in them having an arborescent appearance. The peritoneal cavity contained about eight ounces of clear bloody serum about the color of port wine.

The mucous surfaces of the stomach and intestines were pale and covered with a whitish gray opaque mucous. The stomach contained a small amount of liquid which resembled beef tea. There was no trace of normal fecal matter in the whole alimentary canal, and no odor excepting the usual cadaveric odor.

Microscopical examination of the intestinal mucus revealed the presence of numerous bacteria but no well-marked comma shaped bacilli were found. Exhibit H is a camera lucida drawing of this preparation.)

The diagnosis made was, acute gastro-intestinal catarrh of a suspicious character.

There was no more sickness of a suspicious nature amongst these immigrants and after thorough disinfection of themselves and their effects they were released from quarantine August 29.

The great value of the supplemental bills of health given by R. W. Irwin, Esq., during the epidemic in Japan led me to request that all of the Hawaiian consular agents at ports of departure be instructed to give such bills of health to all steamers and vessels clearing for Honolulu. The object is to inform the authorities here at the earliest moment of the prevalence of any dangerous disease at the port of departure. The form adopted is modelled after that used by the United States consuls.

F. R. DAY, M. D.,
Port Physician.

INTER-ISLAND TRAFFIC.

One of the most responsible and annoying problems the Board of Health had to solve during the recent epidemic of cholera was that of regulating inter-island passenger and freight traffic.

When the serious nature of the disease was first suspected the Board at the suggestion of President Smith immediately put a stop to passengers leaving Honolulu. This action was taken on August 20. Steamers that were already loaded were allowed to depart and land their freight providing the crews did not mingle with the people on shore.

When the steamers returned to Honolulu they brought word that at many places on the other islands they were not allowed to land freight.

After some discussion it was decided, on August 26, not to allow freight to leave Honolulu until further notice.

This action was taken in view of the peculiarly helpless position the people on the other islands would be in if the disease should reach them, and also of the fact that it would not put them to special hardship to be without supplies for a short time.

The leper settlement at Molokai was the only place excepted. Being entirely dependent upon Honolulu for supplies it was decided to send steamed "paiai" on the str. Mokolii as usual.

Protests were received from residents of Hilo, Wailuku and Lihue against shipping passengers and freight from Honolulu.

The Chinese immigrants who had been held at the quarantine station fourteen days after the last case of sickness had disappeared were, after thorough disinfection of their baggage, shipped on the str. "Kilauea Hou" in charge of Mr. McVeigh with an official statement from the Board of Health that they were free from disease. A portion were landed on Maui after the greatest difficulty and another portion were landed on Hawaii without opposition, but those bound for Kauai were refused a landing.

The feeling in certain parts of the islands was very intense

against any intercourse whatever with Honolulu. By Sept. 1, however, reports were received from some of the districts that supplies were getting low, and it was evident that it would soon become necessary to devise measures for their relief.

At a meeting of the Board of Health held Sept. 2, the subject was brought up for discussion and it was referred to a joint committee of the Planters' Association and Board of Health.

The next day the committee recommended placing such inter-island steamers as the companies desired in quarantine after thorough disinfection of vessels and crews. At the expiration of five days passed outside of the harbor, if no disease had appeared on board they were to be allowed to depart with such freight and passengers as the Board would permit.

Those cabin passengers who would undergo disinfection and a five-day quarantine on board of the steamers outside of the harbor were given permits to leave Honolulu.

Only the absolute necessities of life were allowed to be shipped, and then only after thorough fumigation in the ship's hold. The list agreed upon was rice, flour, hay, grain, coal, medical supplies, coin and mail. Later tea, machinery, rice bags, lime, cement, kerosene and machine oil were added to the list.

The steamers W. G. Hall, Waialeale, James Makee, Kauai, Keau Hou, Mikahala and Kaala, Claudine, Likelike, Kilauea Hou, Lehua and Mokolii and three schooners were placed in quarantine and thereafter had no communication with the shore, except as authorized by the Board of Health until the embargo was lifted in October.

Vigorous protests were sent to the Board from Wailuku, Lahaina, Hilo, Kohala and Lihue against sending passengers and freight from Honolulu under these restrictions. They were not considered sufficiently rigid. The physicians on Kauai especially took issue with the Board on the five day quarantine limit.

Owing to this opposition to the landing of freight and passengers even after having undergone a rigid quarantine and thorough disinfection and the real distress in certain districts

occasioned by the non-arrival of supplies, the position of the Board of Health was a trying one.

After adopting every measure to insure safety the Board felt that its action should have been accepted with confidence, yet it did not like to insist upon the people on the other islands receiving passengers and freight against their will.

To overcome the difficulty the Board established local Boards of Health for the islands of Hawaii, Maui and Kauai. These local boards were empowered to look after the sanitary matters of the respective islands and impose such additional restrictions on passengers and freight as seemed necessary. This step met with the hearty approval of the protestants but it failed to cause harmony for the additional restrictions imposed by the various boards increased rather than allayed the sectional differences.

On September 12 some of the leading merchants of Honolulu proposed to the Board of Health to establish in Honolulu a quarantine wharf where foreign vessels might discharge cargo and where this clean freight might be shipped in clean steamers to the other islands without coming in contact with any person from town. The Pacific Mail wharf was selected. It and the warehouses were thoroughly cleaned and disinfected. A gang of disinfected stevedores were housed and fed on the wharf, a military guard was stationed around the wharf to insure a strict quarantine being maintained and after five days during which the men were under observation it was used to receive foreign freight. By Sept. 19 it was in readiness for use. Later the Oceanic wharf was similarly prepared and used. Under these restrictions inter-island trade was carried on until they were removed by an order of the Board of Health in October.

As the epidemic declined it was deemed safe to send new merchandise from the warehouses in town, but all second-hand goods were prohibited. Inspectors were appointed whose duty it was to see that only such goods were sent, and the Inter-Island Steamship Companies were only allowed to receive freight from mercantile houses holding licenses, and only such freight as bore the inspectors' labels.

This experience demonstrated that in times of epidemic inter-island traffic can be carried on with perfect safety, by observing such precautions as were taken.

F. R. DAY, M. D.,
Port Physician.

GENERAL MEDICAL REPORT BY DR. C. B. WOOD.

HON. W. O. SMITH,

President of the Board of Health.

Sir:—

I beg leave to submit the following general report upon the recent outbreak of Asiatic cholera in Honolulu.

The O. & O. S. S. "Belgie" arrived at the port of Honolulu upon the afternoon of August 9, 1895, 12 days from Yokohama. She brought for this port freight described as follows:

From Hong Kong, 177 tons, 1793 packages—oil, tea, rice, beans, provisions, cigars, clothing (1 pkge.), and general mdse.

From Yokohama 2279 pkgs.—cotton goods, curios, matting, provisions, straw hats, soy, miren, clothing (1 pkg.), and general merchandise.

From Kobe 812 pkgs.—dried raddish, provisions, flour, soy, saki, vinegar, miso, miren, and cotton goods.

She brought also for this port 555 passengers, as follows:—eight European passengers (five cabin and three steerage) and 539 Asiatic immigrants of which 505 were Chinese and 34 Japanese. The immigrants were engaged as follows:

For Kauai—

Koloa plantation.....	30
A. S. Wilcox	11
Makee plantation	40
	— 81

For Maui—

Hawaiian Com. Sugar Co.....	96
Haiku plantation	15
	— 111

For Hawaii—

Ookala plantation	21	
Hilo plantation	30	
Pepekeo plantation	30	
Hutchinson (Kau)	20	
	—	101

For Oahu—

Ewa plantation	25	25
For Maui (assigned to Chinamen).....	20	20
		<hr/>
		338
Other laborers	201	
		<hr/>
		539

She was boarded outside as usual by the port physician. She exhibited a clean bill of health from Hong Kong, dated July 20, 1895, and also one from Yokohama dated July 29, 1895. She also brought a special report from R. W. Irwin, Minister resident at Yokohama. The latter reads as follows:

“Altogether there have been 20 cases of cholera in Yokohama up to July 25, midnight. There was not one reported on July 26 up to midnight. In the whole Prefecture of Kanagawa there were (in addition to Yokohama) a total of 33 cases up to July 25, from the beginning of the outbreak. In the whole empire during the same period (including Yokohama and Kanagawa Prefecture) 9,625 cases (including 1,062 on army transports) with 5,874 deaths have been officially reported.

“The Japanese Government has not declared Yokohama an infected port and with so few cases I do not consider cholera as yet epidemic in Yokohama.

“The Japanese Government is very strict and every case of cholera is reported; no doubt sometimes cases of ordinary cholera or cholera morbus have been officially reported as Asiatic cholera.”

Signed,

R. W. IRWIN,

Hawaiian Minister Resident.

The ship's physician reported three deaths upon the voyage, all Chinese, and gave as the causes of death in two cases “heart

disease" and in the remaining one "pneumonia." He also reported one Chinaman sick with "fever."

The freight was unloaded the following day as usual upon the wharf, there being employed in this duty one Chinaman, one Italian and thirty-two natives. These men did not board the vessel but received the freight upon the wharf. Four of them subsequently accompanied the immigrants to the quarantine station. None of these men have developed any symptoms of cholera. None of them live at Iwilei.

Most of the freight was consigned without delay and a considerable quantity of it shipped to the other islands of the group before any restrictions were placed upon inter-island commerce.

The Chinese and Japanese immigrants were landed at the quarantine station upon August 10 (Saturday). The sick Chinaman was assisted to the station and vomited in the scow on the way over. The rest of the immigrants appeared to be in ordinary health.

After reaching the quarantine station the sick man was taken with violent vomiting and purging accompanied by cramps. He was immediately separated from the other immigrants. A young Chinaman accompanied him as nurse. The sick man died the next day, August 11. Upon the following day (August 12) the young Chinaman who had attended this case was himself taken suddenly ill and died the next morning at 9 o'clock (August 13) after an illness of only fifteen hours. He was not seen by a physician but his symptoms were described by Mr. McVeigh, the official in charge of the quarantine station, as follows: "Violent purging and vomiting, cramps in abdomen and extremities. He became rapidly emaciated and his body was cold." Dr. Day held an autopsy upon the body of this man about 27 hours after death. He found the body emaciated; postmortem discoloration of the skin, especially over the abdomen; abdomen distended; peritoneal cavity contained eight ounces of reddish serum; peritoneum injected over whole intestinal tract; intestines distended; internal surface of whole alimentary canal coated

with thin mucus of a grayish color; mucous membrane of intestines pale. A specimen of mucus from the intestine was saved for microscopical examination.

Upon August 11, the day following their landing, two of the Chinese immigrants were taken sick at about the same time. One was an old man, the other one of middle age. The symptoms in these cases were the same as in the ones already described, viz: violent vomiting and purging accompanied by cramps. These two patients were seen by Drs. Day and Myers and the symptoms were promptly controlled by treatment. The vomiting and purging ceased and reaction occurred so that the next day the men were both apparently convalescent. The younger of these two men recovered. The other one, without any return of the gastro-intestinal symptoms, sank into a comatose condition and died upon August 15. The stools in all of these cases were described as being "like molasses."

Tuesday morning, August 20, at about eleven o'clock Dr. Murray reported to the Board of Health that he had treated two suspicious cases at Iwilei, and in the light of the sickness which had occurred at the quarantine station he considered his own cases to be Asiatic cholera. In consequence of this report a meeting of the Board of Health was called for 12:30 p. m. A number of physicians and others were invited to be present at this meeting.

Meanwhile the district in Iwilei in which the cases had occurred was visited by the President and the physicians of the Board and the locality was immediately placed in strict quarantine. The Board met at 12:30 p. m. and listened to the following verbal report from Dr. Murray:

"Sunday night (August 18) I was called to Iwilei and found a native woman, about fifty-five years of age in a state of collapse. At ten o'clock a. m. she had been taken with violent spasms, pain in the pit of the stomach and diarrhoea, and the people there told me that she had dirty water discharges. They were all natives and could speak no English so I could get very few particulars. I could not get a sight of her dis-

charges. This was about nine o'clock in the evening. Her pulse was small and she had cold, clammy perspiration. I did what I could to relieve her and went home. They telephoned me in the morning that she had died, about twelve hours after the onset. I left instructions there with the people how to act if anything should occur. The next night (Monday) I was called over to the same place, a neighboring house. Another native woman was taken ill; her symptoms being similar to the first case. I had left instructions to preserve all discharges and they showed me hers. It was pure rice-water discharge. They had given her stimulants so her pulse was nearly normal. She had about eight passages in three hours. I gave her some medicine and left and they telephoned over this morning that she was better. I have not seen her since last night."

Dr. Murray said that he had seen cholera in Paris and that he believed these cases to be genuine Asiatic cholera.

A general discussion of the cases at Iwilei as well as those at the quarantine station followed. The physicians present while not willing to accept the diagnosis of Asiatic cholera until proven by culture experiments were unanimous in the opinion that stringent measures should be taken by the Board of Health—the authorities to act immediately upon the hypothesis that the disease was Asiatic cholera.

The President of the Board stated that the suspected locality was already under strict quarantine.

It was also decided at this meeting to stop all passenger travel between Honolulu and other ports of the group. The inter-island steamers were allowed for the present to sail with freight and mail under the condition that the officers and men would not land and mingle with the people at any landing at which they touched.

Dr Myers was appointed physician in charge of the suspected locality at Iwilei and instructed to make house to house visits twice a day. The next morning, Wednesday, August 21, two new cases were reported. The first one, a native woman living in the quarantined district at Iwilei, close to the two

previous cases, had been taken sick the previous day and was discovered by Dr. Myers at about nine o'clock a. m. (August 21) during his house to house inspection. The other case was a native man, Lono, by name, who was taken sick upon the Pauoa stream just above the point at which it joins the Nuuanu stream. This man had been living at Iwilei but left previous to the establishment of the quarantine. Specimens of the stools and vomit in each of these cases were obtained and culture experiments were immediately started by Dr. Day.

Upon this day (August 21) another meeting of the Board of Health was called, to which all of the physicians in the city were invited. Specimens of the stools and vomited matter were exhibited as were also microscopical slides from the specimens. The stools and vomit resembled in every particular the discharges of Asiatic cholera.

A free discussion of the cases by the physicians followed. The general opinion was that while a positive diagnosis of Asiatic cholera should not be made until proven by the culture experiments, every possible precaution should be taken by the Board of Health to prevent the spread of the disease.

The physicians present unanimously endorsed the measures already taken by the Board and very generally volunteered their services.

Thursday morning (August 22) a meeting of the Board was called for the purpose of hearing the report upon the culture experiments. It was announced at this meeting that the four cases so far reported were all dead and that no new cases had been reported. Dr. Day who had conducted the culture experiments made the following verbal report:

"Dr. Myers handed me a specimen yesterday morning from a case of suspected cholera, and another specimen in the afternoon, and I immediately inoculated two culture tubes from these specimens. They were both from one case, the woman who was taken sick yesterday. She died last night at eight o'clock. One specimen was from her vomit and the other from her intestinal discharge. I inoculated two tubes of sterilized gelatine and today they have developed sufficiently

for a positive demonstration. Yesterday afternoon a third specimen was given to me by Dr. Myers. The intestinal discharge from the man Lono who was taken sick on yesterday morning and died last night about 7:30 o'clock. Microscopical examinations were made of all the specimens. Those from the intestinal discharges of the woman and the man showed the same form of germ, a small, curved bacillus resembling in every way the bacillus of Asiatic cholera. A microscopical examination has just been made of the culture made from the intestinal discharge of the woman and that shows a pure culture of the same form of bacillus, a curved, comma shaped bacillus corresponding in every way to the bacillus of Asiatic cholera. I think the chain of evidence is now complete, as we have the pure culture from these discharges. Dr. Wood saw the microscopical specimens and Dr. Herbert also saw the last one a few minutes ago. I would like to ask their opinions. We had only time for one culture. "We have in these two cases the same form of bacillus which is identical in every way with the bacillus of Asiatic cholera. The culture shows that this particular form of germ is present in these cases—a germ that is not present in ordinary cases of diarrhea. The culture itself is typical of the culture of Asiatic cholera in that it liquefies the top of the gelatine and that it develops within twenty-four hours. The bacteriological investigations confirm the clinical evidence. The cases that have died so quickly with the symptoms of Asiatic cholera I think, in the light of these researches must be considered that disease."

Upon this report of Dr. Day's which was confirmed by Drs. Herbert, Myers and Wood the Board of Health pronounced the disease to be Asiatic cholera and proceeded to use the most stringent measures to prevent the disease from spreading.

For three days following the fourth case (which was reported upon August 21) no new cases were reported and during this interval the Board held daily meetings to which citizens were invited. Artesian water was turned into the city mains on August 22 and the reservoirs supplied with surface water from the mountains were used to supply only those portions of the city which on account of their elevation could not be supplied

by the pumps. Circulars containing instructions to the people concerning the boiling of water and thorough cooking of all food were printed in English, Hawaiian, Portuguese, Japanese, and Chinese and posted in prominent places and also freely distributed around town.

Fishing was absolutely prohibited because of the native custom of eating fish raw.

All freight and passenger traffic between Honolulu and all other ports of the islands was stopped.

The city was divided into ten districts, each district being under the supervision of a physician. Gangs of men were employed to work directly under the instructions of these physicians and proceed as rapidly as possible to inspect all premises—at the same time correcting any existing unsanitary conditions. Each of these gangs of inspectors was furnished with a wagon and a large quantity of unslacked lime and other disinfectants.

Upon the morning of August 24 two new cases were reported—both men. One case was in the infected district at Iwilei and the other upon Queen street opposite the Board of Health office. The case upon Queen street was that of a young native man—about twenty years old, and was a typical case of Asiatic cholera. He was seen by all of the members of the Board of Health and by at least seven physicians. If any doubts about the nature of the prevailing sickness had remained in the minds of any of the members of the Board this case would have removed them.

The young man was perfectly well upon August 23, upon which day he was engaged in sanitary work for the Board of Health. At about two o'clock in the morning of the 24th he was taken with violent cramps in the abdomen, calves of the legs and hands. He began to purge and later to vomit. He became rapidly very weak so that he could not stand. The surface of his body became cold and clammy. Vomiting and purging continued. The stools and vomited matter were clear—almost colorless—and looked like pure water except for a slight opalescence and a white flocculent sediment. They seemed to be typical rice-water stools.

He was first seen by a physician at about ten o'clock in the morning when the writer of this report was called in. The patient was found lying upon his side with his knees and thighs flexed. His face was pale and his eyes sunken. His skin was damp and cold. His temperature was subnormal. His fingers were shrivelled up as though the hands had been immersed for a long time in hot water—showing a striking example of the condition known as “washerwoman’s fingers.” His hands were held half closed in a claw-like manner and his finger nails were blue. He lay perfectly quiet in an apathetic state but could be easily aroused to answer questions.

In spite of the most vigorous treatment he grew steadily worse. In three or four hours his face had emaciated so greatly that it would have been difficult to recognize him. It proved impossible to bring him out of the algid stage and he died at midnight after an illness of about twenty hours.

Following these two cases there was an interim of five days before any fresh cases were reported.

This short period of quiescence is of the greatest significance and a study of the next cases which occurred, their locality, proximity to bodies of water, and all circumstances connected with the probable sources of infection is of great importance. A brief summary of events up to this time will help in the study of the events which immediately followed.

SUMMARY TO AUGUST 25TH.

Aug. 9.—Arrival of O. & O. S. S. “Belgie” with Chinese and Japanese immigrants—reporting three deaths at sea and having one sick man aboard.

Aug. 10.—Immigrants, including sick man landed at quarantine island. Sick man vomited on way over to island and on arrival there taken with cramps and diarrhoea.

Aug. 11.—Death of sick man at quarantine island. Two other immigrants taken with cramps, diarrhoea and vomiting.

Aug. 12.—The Chinese nurse of first case taken sick with same symptoms.

Aug. 13.—Chinese nurse died after sickness of fifteen hours.

Aug. 15.—Death of one of the two Chinamen taken sick on August 11.

Aug. 18.—Native woman taken sick at Iwilei with symptoms of Asiatic cholera. Died in twelve hours.

Aug. 19.—Another native woman taken sick at Iwilei, in house adjoining that of first woman. (Died on 21st.)

Aug. 20.—Third case, also native woman, taken sick at Iwilei near the other two. Died in 24 hours (Aug. 21).

Aug. 21.—Lono, a native man who escaped from Iwilei, taken sick in house on Pauoa branch of Nuuanu stream. This man's soiled linen was washed in the stream. Died same day.

Aug. 24.—Native man taken sick at Iwilei, making fourth case in this district. Ultimately recovered.

Case on Queen street opposite Board of Health office. Died in twenty hours.

Thus up to the evening of August 24, there had been six cases of cholera in the city and five of them were dead. One untimately recovered.

Five of the cases could be traced directly to one locality in Iwilei and were undoubtedly due to a common source of infection. No connection between the case on Queen street and the others could ever be traced.

The most thorough and careful investigation failed to discover any connection between any of the cases and the Belgic or the quarantine station except such as may have occurred through the waters of the harbor.

It was learned that the first woman who was taken sick at Iwilei had been crab-fishing in the harbor near the quarantine island two days previous to the onset of her sickness (Aug. 16).

Upon August 21 the cholera-soiled linen of Lono was washed in the Pauoa stream, thus introducing the infection into this stream and through it contaminating the Nuuanu stream.

After August 24 occurred the interval of five days during which time thorough inspection and disinfection of all locali-

ties known to be infected was carried out. The immigrant depot was evacuated and cleaned up and by August 28 was in condition to receive patients as a cholera hospital.

Upon the afternoon of August 29 one case was reported and before night of the next day eight more cases. These nine cases were located as follows: On the Nuuanu stream 1, at the mouth of Nuuanu stream 3, near Nuuanu stream 2, in the harbor (U. S. S. Bennington) 1, near Liliha and School streets 1, on Fort street 1. During the next three days, to Sept. 3, ten new cases occurred. They were entirely confined to three or four localities in the neighborhood of the Nuuanu stream with the exception of two cases. One of these occurred among the people quarantined at the cholera hospital and the other one outside but near the cholera hospital.

The foregoing facts are so significant as to require no argument when it is understood that cholera is always a "water borne disease."

After Sept. 3 the cases became scattering but in every case followed the water courses if any became infected.

Upon Sept. 4, the first case at Waipilopilo was reported. This district is described in the "Report of the Committee upon Contamination of Water and Soil." (See page....)

This first case occurred in a two story house in which were living twenty-four persons. The case was not reported until after death. There was a surface well in the yard and the water in which the cholera-soiled clothing was washed was thrown upon the ground close to the edge of this well and undoubtedly found its way directly into the well and also into a neighboring rice patch. Thirteen cases of cholera were taken from this one house and five more from along the course of a ditch into which the water from the infected rice patches drained, within seven days from the first appearance of the disease in this locality.

Thanks to the prompt and efficient work of the police department and the citizens' committee the disease was hemmed in and confined almost completely to the city proper and in this way the infectious material was prevented from getting

into the streams, ponds and taro and rice patches which abound in the outer districts. In order to appreciate the gravity of allowing infectious material to get into taro patches or rice fields it must be known that these products are cultivated in fields of water. These fields are composed of numerous banked in areas of greater or less extent, all communicating with one another and irrigated by a slow but constant flow of water from the higher to lower areas. In this way many areas of sloping land are cultivated in the same locality. Such fields are practically lakes and an infectious material which like that of cholera consists of live and rapidly multiplying germs could in a short time find its way over the whole area.

So far as is known the only bodies of water which became infected were the harbor, Nuuanu stream and surrounding ponds, the rice patches and ditch at Waipilopilo and the taro patches above the Insane Asylum.

Mr. J. T. Crawley succeeded in getting a culture in gelatine, of the comma bacillus, from a specimen of water taken from the infected rice patches at Waipilopilo 23 days after they became infected. These rice patches were subsequently dried up by order of the Board of Health.

Two cases of cholera broke out in the Insane Asylum—one upon Sept. 28 and the other upon Oct. 2. In all probability these cases became infected from the water in the neighboring taro patches. These two cases proved to be the last ones of the epidemic. The taro patches were immediately condemned by the Board of Health and a patrol guard established over them. They were afterwards dried up and the taro destroyed.

Cases were reported from more than twenty-five localities extending from N. W. to S. E. over a distance of about three and one-half miles.

There were in all eighty-eight cases reported with twenty-four recoveries and sixty-four deaths. Sixteen were dead when reported, nineteen were dying when reported and the rest, fifty-three in number, were reported early or comparatively so.

By nationality there were—

80 Hawaiians,
4 Americans,
2 Portuguese,
1 Chinese,
1 Japanese.

The citizens of this community have made a record for themselves of which they may be justly proud. That the physicians of the city should have sacrificed their own private interests and offered their services for the common good is not strange—they always do so under similar circumstances—but it is not usual for a whole community to drop its ordinary pursuits and go to work with the promptness, energy and unanimity with which the citizens of Honolulu acted at the very beginning of the late epidemic.

It speaks well for the intelligence of this community—an intelligence and an energy which were well rewarded by the prompt suppression of an epidemic which threatened to wipe the native race out of existence.

I have the honor to be

Yours very respectfully,

C. B. WOOD, M. D.

REPORT OF DR. R. P. MYERS.

W. O. SMITH, Esq.,

President Board of Health.

Sir:—

I have the honor to make the following report of my services as medical inspector for the district of Honolulu, island of Oahu, also of my duties as one of the physicians at the cholera hospital, district of Kakaako:

On the afternoon of August 20, 1895, (when it was decided by the Board of Health we had cholera amongst us), I was appointed and commissioned as medical inspector for Honolulu, and entered upon my duties at once, and was relieved October 16, 1895.

On the morning (8:15) of August 21, with Mr. C. B. Reynolds, Executive Office of the Board of Health, I visited Iwilei district in rear of Oahu prison and made a house to house inspection, seventeen in all, and found them clean cut premises requiring raking and sweeping. I ordered it done and the rubbish burnt, which was completed by 12 m., then had lime put in all the privies and around the houses, out houses, chicken coops and fence corners. In fact had the whole place disinfected and the fences white-washed. Iwilei's proximity to the quarantine station and distance therefrom can be seen by reference to the map of Honolulu. The only unsanitary place in the district was a Chinese duck yard and pond which was in a very filthy condition. The fish house inspected was Kailianu, where I was informed his wife died Sunday night, August 18, aged 63 years, Hawaiian. My informant also stated that the woman vomited after being massaged, had diarrhoea, with clammy sweat over surface, was taken ill Sunday, 6 a. m.

Case No. 2.—Honoko, Hawaiian, aged 66. Wife of Chinaman. Taken ill Saturday at 12 noon, vomited and purged freely, very watery and milky in appearance. Poi and raw fish was her ordinary diet. While out fishing she got very wet. Seemed to be improving Wednesday morning (August 21), but went into collapse in afternoon and died that evening at 6:45 of cholera.

Case No. 3.—Mrs. Namokuaha, Hawaiian, aged 41. Taken ill Tuesday, August 20, with vomiting and purging, same as in case No. 2; she also had been out fishing and got wet and remained in wet clothes for some time. At 9 a. m. (August 21) complained of severe pains in calf of leg and forearm. Surface cold, eyes sunken with dark ring around them, shrunken face and covered with clammy sweat. While I was feeling her pulse she vomited pure rice water, such as I saw during the epidemic of Asiatic cholera in Savannah, Ga., U. S. A., summer of 1866. The vomit was so typical that I brought some of it to Dr. Day for examination. At 12 m.—extremities and breath icy cold. Said to have had (by nurse) ten watery operations since my visit, same in appearance as the vomit.

Great thirst, covered with clammy sweat, cramp in legs and arms, husky voice. Sinking, but ordered treatment continual; 7 p. m. tossing and writhing about bed, impossible to take pulse or temperature; died at 9 p. m., August 21.

Case No. 4.—Lono, Hawaiian, aged 20. Saw him in Nuuanu avenue at a banana farm at 8:30 a. m., August 21; he came from Iwilei. I saw him at 11 a. m. same day; low temperature and pulse, cold, clammy sweat, watery stools; at 2 p. m. no change in him; procured stool for Dr. Day. Lono died at 8. p. m., August 21.

Case No. 5.—Nohoanu, Hawaiian, aged 39 years. Lived at Iwilei district; taken ill Saturday, August 24 with following symptoms: purging and vomiting rice-water-like fluid, thirst intense, severe muscular cramps—most severe in the calves and arms, some abdominal—appearance frightful; eyes sunken and surrounded by black rings, nose pinched and pointed, cheeks hollow, lips blue, surface cold and moist with a sticky perspiration; the skin of the hands and fingers had the sodden appearance of one whose hands had been in the water all day; the voice weak and husky, tongue like ice and breath cold; on August 26, total suppression of urine which lasted 42 hours, and then followed hiccough for 32 hours. This case went through all of the stages of Asiatic cholera, recovered, and on the 29th of August was going about the house, and is living today. No further cases occurred at the Iwilei district; the disinfectants were freely used for some time after the last case and a most rigid quarantine was kept up by the Board of Health.

During the last ten days in August with Mr. Reynolds, I visited all parts of the city and surrounding country day and night, and I am free to say had it not been for the unceasing labors of the Board of Health with the free assistance of the citizens an epidemic of cholera would have occurred the extent of which it would have been impossible to predict.

On the 30th of August by order of the Board of Health I was assigned to the cholera hospital at Kakaako (see map of Honolulu) for the reception of cholera patients, with Mr. C. J. Whitney as steward. On that day six patients were admitted. Mr.

Whitney entered upon his duties August 26, and put the grounds and buildings in order; on the 30th engaged Laurence as nurse, L. F. Lawler as cook; on 31st, Elizabeth Kapaa (H) and J. H. Gibson; Sept. 1, Fanny Kaleikoa as nurse; on Sept. 4, Mr. Armstrong Smith volunteered his services which were thankfully accepted, and he and Mr. Whitney were the stewards; Sept. 4, Miss Louisa Bal (H) reported as nurse and was in charge until trained nurses were procured. She made a most efficient nurse and labored faithfully, leaving on the 7th; Misses Lamb, Heslop, and Estelle reported for duty and did good service during their stay. And from time to time as the emergencies arose assistance was brought in, until the total number on duty was twenty. A committee on hospital was appointed by the Board of Health some days after the hospital was opened, consisting of Drs. Herbert, Wood and Smith; they formulated a plan to have one physician on duty at all hours of the day and night, as follows:

Dr. R. P. Myers, from 8 a. m. to 2 p. m.

Dr. N. B. Emerson from 2 p. m. to 8 p. m.

Dr. H. W. Howard from 8 p. m. to 2 a. m.

Dr. J. K. Smith from 2 a. m. to 8 a. m.

Drs. Wood, Geo. Herbert, C. C. Ryder, J. T. Wayson, and C. T. Rogers also assisted from time to time as their services were required.

The number of cases received into the hospital from August 30 to October 2, was 79, with the following result:

Brought in dead14

Treated in hospital65

Died in hospital41

Recovered in hospital24

Many of the cases were brought in the last stages of the disease, some so far advanced it was impossible to treat them.

No better place, nor one as well suited for a hospital of the kind could have been selected in or near Honolulu, and when you consider the short notice I am surprised at the excellent arrangements that were perfected. The Board of Health was most generous in all of its supplies. The first nurses procured

were untrained but did most excellent work under the physicians in charge; and Mr. Whitney, who labored most earnestly and cheerfully from the time he entered upon his new and exciting labors, always on hand, cool and willing. By reference to the case book of the hospital you will see a great reduction in the death rate during the latter days, which was evidently caused by the cases having been brought in in the early stages of the disease, consequently they yielded to the treatment. In the first days of the hospital the patients that were brought in were dying and a number dead—succumbed without treatment. The natives were opposed to going to the hospital, having been advised by those who professed to be their friends to keep away from the white doctors (except a few) and not to take their medicine. But later on as they saw and heard of recoveries, their native friends advised them to report cases in the first stages or as soon as they were attacked and they did so. Hence the small death rate as compared with the first few weeks. All of the nurses were attentive and kind; Miss Bal's advantage was in speaking the language, consequently she had more influence with the natives, which made her service doubly valuable. I cannot close this report without special mention of our volunteer, Mr. Armstrong Smith, as a most able and efficient steward.

The following is the roster—

C. J. Whitney, steward, August 26, 1895.
 Frank Lawter, cook, August 30,
 Lawrence, attendant, August 30,
 Elizabeth Kapaa, nurse, August 31,
 J. H. Gibson, attendant, August 31,
 Fanny Kaleikoa, nurse, Sept. 1,
 Armstrong Smith, steward, Sept. 4,
 Louisa Bal, nurse, Sept. 5,
 Eval, cook, Sept. 5,
 Kamalu, laborer, Sept. 6,
 Evamota, laborer, Sept. 6,
 Butchers, laborer, Sept. 6,
 Miss Estelle, nurse, Sept. 7,

Miss Lamb, nurse, Sept. 7,
 Miss Heslop, nurse, Sept. 7,
 Mary Kaoka, laborer, Sept. 8,
 Becky Robinson, laborer, Sept. 8,
 Nakatani, laborer, Sept. 10,
 Ben Haaheo, laborer, Sept. 10,
 At Men, cook, Sept. 16.

The causes of the epidemic and treatment I leave for others to report upon. Of the latter I feel sure the profession were of one opinion.

R. P. MYERS, M. D.

REPORT ON THE CHOLERA HOSPITAL AT KAKAAKO,
 BY N. B. EMERSON, M. D.

The necessity of establishing a hospital for the reception and treatment of cholera cases was early made manifest to the Board of Health, and at a special meeting held on Saturday, August 24, it was voted to use the immigration depot for that purpose.

The work of cleaning up the buildings and putting the place in shape was entrusted to Marshal Brown.

The advantages of this place were its accessibility, the suitability of its buildings, and the fact of its being fenced.

The ground, though only a few feet above tide level is sandy and water almost at once filters through and leaves the surface dry.

Dr. R. P. Myers being in charge, the first case of cholera, Simeona, was received on August 30, his being the seventh case of the disease from the beginning of the epidemic.

The disease declared itself in his case on the afternoon of the 29th. When brought to the hospital he was in a state of collapse, pulseless, with sunken features, breath cold, surface clammy, which, taken in connection with the symptoms that had preceded and that followed, made up a perfect clinical picture of Asiatic cholera.

The other symptoms were vomiting, rice-water discharges, cramps in extremities.

Milk punch, etc., as a stimulant, boiled water, acidulated with mineral acid (aromatic sulphuric), for a drink, and an opiated and camphorated diarrhoea mixture, containing tr. opium, tr. capsicum, spts. camphor, spts. chloroform, and spts. peppermint, administered according to necessity, formed the treatment.

This case, much to the gratification of the medical men in charge, made a good recovery and on the sixth of September had got along so far as to be sent into the convalescent ward, from which he was discharged on the ninth.

This was the second recovery from the beginning of the epidemic, a result that was largely due to the fact that it was under observation and treatment from an early period of the disease.

Reference to the accompanying list will show the whole number of patients of all descriptions received at the hospital to have been 80.

Analysis and study of the symptoms of these cases shows numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 24, 25, 26, 27, 29, 30, 32, 37, 38, 39, 40, 41, 42, 43, 44, 46, 50, 51, 52, 53, 56, 57, 59, 61, 62, 63, 64, 65, 66, 69, 70, 71, 73, 74, 76, 77, 78, and 80, fifty-eight cases, to have presented complete or nearly complete clinical pictures of the disease, thus entitling them to be considered typical cases of Asiatic cholera. These cases are indicated on the list by the letter T.

Application of the same principle and measuring by the same standard, shows cases numbered respectively 21, 22, 28, 31, 33, 34, 35, 36, 45, 47, 48, 54, 55, 58, 67, 68, 72, 75, eighteen in all, to have been of a mild type, and in several cases, it is open to question whether they were really cases of cholera. I would particularly mention numbers 31, 54, 55, 67.

It should be remarked that this division of cases into classes marked in one class by great and often fatal severity and in the other by the utmost mildness of symptoms, is in perfect accord with what has been observed in epidemics of Asiatic cholera elsewhere.

All of the cases mentioned as doubtful made good recovery.

If in the stress and urgency of the situation which called for instant decision and action, any error in diagnosis was made it was unavoidable and certainly on the safe side and no harm was done to the patient himself. Number 67 was sick but two days, one of which he spent in the hospital. He had no vomiting or cramps, and nothing in his features suggested the disease.

Number 54 had only a slight diarrhoea and is strongly open to doubt. She began to menstruate the very day of her entry, showing that the drain on her blood supply must have been the smallest. The same remark would apply to number 33, who also began to menstruate after being in the hospital two days.

Number 55 had diarrhoea and cramps, a very mild case at the most.

Number 67 was taken ill with diarrhoea while in quarantine. His wife, number 65, a typical case, had died in collapse. The physician in charge at the time of his entrance made the following entry in the record book: "No symptoms of cholera that I see at present."

It should be explained that the immigration depot was divided into three courts, of which the central one was occupied by the cholera patients, the eastern by convalescents, and the western was used as a place of quarantine for friends and relatives who were with the cholera patients when the latter were taken sick.

There were several patients admitted to the hospital who were evidently not affected with cholera, 23, 49, 60, 79.

Number 23 asked to be admitted declaring he was suffering with cholera and that he presented all the symptoms.

All the physicians who saw him agreed with the note recorded in the record book which said that he presented "no cholera symptoms at all."

Number 49, a suckling of six months, whose mother had died of the disease, had the vomiting and diarrhoea common to infants. There were no symptoms typical of cholera. The

fact that it was in an infected house and that its mother had died only a few days before, a marked case of cholera, was good reason why it should be sent at once to the cholera hospital. With the proper correction made to its diet and good nursing it made a good recovery.

Number 60 was a prisoner, while quarrying rock, was taken with pain in his stomach, vomited plentifully and was greatly prostrated. When entered at the hospital had a pulse of 136, temperature of $106\frac{1}{4}$, stertorous respiration, contracted pupils, and was in a comatose condition. Quinine was ordered given hypodermically, ice was applied to the head and neck, heat to the feet, and brandy was administered hypodermically. The temperature rose before death to 109, and violent clonic spasms set in. It was evidently a case of sunstroke.

Number 79 was an inmate of the station house and being taken with vomiting, diarrhoea and abdominal pain was sent to the hospital as a precautionary measure.

He presented none of the typical symptoms of cholera.

All the cases under this class are indicated by the figure 0.

The whole number of names entered in the record book of the hospital is 80. This includes 14 names of dead bodies received, all typical cholera cases, seven male and seven female. It also includes the names of four persons ill with other diseases than cholera, who were patients in the hospital.

Thus it will be seen that the whole number of cholera cases actually treated at the hospital was 62.

Typical cases treated at the hospital..	44
Of these males that recovered.....	4
Of these females that recovered.....	1
Of these males that died.....	18
Of these females that died.....	21

The number of cases to be classed as moderate is eighteen, of which all recovered but one, an old woman, the immediate cause of whose death was nephritis about a week after the subsidence of all cholera symptoms.

The large number of deaths, especially in the early part of the epidemic, is to be explained not merely by the severe type

of the disease, but from the fact that through superstition, fear, or prejudice against foreign medicine and the "haole" doctor, the Hawaiians concealed their sick. This fact will account for the relatively large number brought in as dead bodies or in such profound collapse as to defy every effort for their relief.

The method of house to house inspection and the work done by the Citizens' Sanitary Committee was of the greatest service in dispelling or modifying these fears and prejudices, and thus no doubt aided in the saving of many lives.

The large number of the patients were brought to the hospital by the ambulance, a service that will be described by someone else, some came in hacks and others in private carriages.

As soon as entered a patient was assigned to a clean room, furnished with fresh mattress and covering, and immediately placed upon appropriate treatment. As soon as feasible soiled clothing was removed and burned or disinfected, and fresh substituted.

It should be remarked here that very soon after the establishment of the hospital, the Board of Health adopted a resolution to allow each patient to choose his own physician, if so disposed; otherwise he was treated by the physician at the time in attendance. The object of this was to allay as much as possible any prejudice that might be felt against foreign doctors collectively, or any doctor in particular. While this plan is no doubt to be credited with aiding to produce the desired results, at the same time it was attended with serious disadvantages, and hampered the work of the hospital. Its result can hardly be approved of as successful or worthy of repetition.

Each physician followed his own ideas of treatment and used his own special formulas in the medicines he furnished or ordered used for the patient. These were not always communicated to the physician at the time in charge, it was not insisted upon, and in many cases no record is available to show exactly what was administered. Speaking from a scientific point of view, this is a matter of regret.

TREATMENT.

The treatment naturally varied according to the indications of the case, the ideas of the different physicians, and to a certain extent according to the light of experience. The treatment successfully used in case No. 1 consisted of a diarrhoea mixture (opium, camphor, spts. of chloroform, capsicum and flavoring matter), acidulated drinks, and milk punch, morphine and atropine used hypodermically to relieve pain and cramps, application of hot water, turpentine or mustard as needed. This substantially outlines the treatment of the first ten cases, all of which succumbed save the first one.

The treatment of the 12th case was modified by flushing with tannic acid solution (one tablespoonful of the powder to two quarts of warm water), and the same was employed on a number of cases that succeeded it. Still there was no relief to the mortality until No. 21, a mild case, was brought in. This recovered.

The natural and legitimate inference seemed to be that the type and severity of the disease and taking the patient in time were more important factors in determining the result than the form of treatment employed, important as this ever must be. Case 22 was also of a mild type. The tannic acid flush was used in his case along with other treatment, until he objected to all treatment. This man recovered.

The Hawaiian in every day life is very fond of treating ordinary disturbances of the bowels with full doses of Epsom salts or cathartic pills. In many cases this practice aided no doubt in producing the fatal results. Case No. 21 seems to have got well in spite of such abuse of drugs (self administered before the arrival of the physician).

Later the flush with tannic acid solution was substituted for one acidulated with sulphuric acid, or following the suggestion of Dr. Lee of Chicago, one containing a solution of soap was employed and all these are to be credited with useful results. The small number of cases, however, forbids drawing conclusions of great scientific value.

Another resource of the greatest value to which seemed to be due some recoveries was the hypodermoclyst of a warm saline solution. So far as could be judged this measure, which seems to be a most rational method of meeting certain indications and replacing the fluids drained from the system, deserves the highest commendation.

As the epidemic progressed, greater precision was introduced into the treatment, and towards the last every case that was deemed by the attending physician to be in a fit state, on arrival at the hospital, was at once removed to a room that had been specially prepared for this purpose; placed on an enema table, and an enema (soap solution, or acidulated) of sufficient quantity to fill the colon was administered at a temperature of 104 degrees F. From one to two gallons of fluid were given. To all patients in a state of collapse, or tending that way, was administered a hypodermoclyst of saline solution (sodium chloride) with or without an alcoholic stimulant.

In these cases the stomach was left at rest as much as possible, perhaps allowed cracked ice, and a saline enema of small size combined, if thought best, with brandy, was administered by the rectum.

Every effort was made to prevent death by heart failure. To this end nitroglycerine, strychnine, atropia, caffeine, digitalis, strophanthus and nitrate of amyl, were administered as indicated, or as preferred by the physician.

DIET.

This received careful attention. A good kitchen was established at the first and the service in this line was at all times excellent. In addition to the usual fluid foods known to all hospitals, poi in a soft or semi-fluid state, made by pounding the steam-cooked tuber of the taro (kalo, or *Arum esculentum*) was found to be a most suitable and agreeable nutriment for all convalescents, as well as those in a moderate stage of the disease.

The city was fortunate in the possession of an ample supply of pure artesian water. No other water was used at the hospital, but even this was invariably boiled before using.

DISPOSAL OF DEJECTA.

The disposal of the dejecta and of all contaminated material was a matter that received the most careful attention. Vomit, urine and the excretions from the bowels were at first thoroughly disinfected and then buried in holes in the ground over which quick lime was spread. Later, dissatisfaction was felt with this manner of treatment and it was changed.

Bichloride of mercury was used as being the best, and when the supply of this powerful disinfectant ran low resort was had to sulphuric acid. After being mixed with a strong solution of the acid, the mixture was boiled and evaporated to dryness over a fire that was kept constantly burning.

It seems hardly possible to devise a more radical and complete method of dealing with such matters than this.

The physicians and nurses used, and the patients and convalescents were instructed to use, the greatest care in washing their hands in a suitable disinfecting fluid after soiling them, and before eating.

DISPOSAL OF DEAD BODIES.

No body was removed to the morgue until it had been viewed and declared dead by one of the attending physicians. This done it was disinfected with a solution of mercuric bichloride—1:1000—wrapped in a sheet likewise disinfected and then laid in a coffin in which quick lime had been placed to a depth of two or three inches. After laying the body on this bed of lime the coffin was filled with lime and then closed.

The regular staff of attending physicians at the hospital was composed of R. P. Myers, M. D., H. W. Howard, M. D., and N. B. Emerson, M. D. J. K. Smith, M. D., also served for a short time until called to another branch of the work. J. T. Wayson, M. D., C. T. Rodgers, M. D., and C. C. Ryder, M. D., also kindly lent their services as substitutes when needed.

Accompanying this is a complete list of all the cholera patients during the epidemic, also a graphic scheme showing the daily number of cases and of deaths from cholera from the beginning to the end of the epidemic.

Respectfully submitted,

Honolulu, January 9, 1896.

N. B. EMERSON, M. D.

Graphic Scheme Showing Daily Number of Cases and Deaths from Cholera during the Epidemic of 1895.



Red Lines indicate "Cases."
Black Lines indicate "Deaths."

All cases are included in this scheme whether entered at the Kakaako Hospital or not. It includes also the case on board the U. S. S. Bennington.

Recoveries, - - - - 21
Deaths, - - - - 64
Total - - - - 87

COMPILED BY N. B. EMERSON, M. D.

LIST OF CASES NOT ENTERED ON THE RECORD BOOK OF THE CHOLERA
HOSPITAL AT KAKAAKO.

No.	Date of Illness.	Name.	Sex.	Age.	Nationality.	Locality.	Result.	Remarks.	Type of the Case.
	1895								
I.	Aug. 17	Honokua	F	70	Hawaiian.....	Iwilei	Died Aug. 21	.....	T
II.	" 18	Keopukaua	F	50	"	"	Died Aug. 19	.....	T
III.	" 20	Kuanalewa	F	41	"	"	Died Aug. 21	.....	T
IV.	" 21	Lono	M	40	"	Peleula	Died Aug. 21	.....	T
V.	" 23	Nohoann	M	29	"	Iwilei	Recovered .....	.....	T
VI.	" 24	D. K. Maalo	M	20	"	Apua, Queen St	Died Aug. 25	.....	T
VII.	" 29	W. H. Goebel	M	20	American	U. S. S. "Bennington"	Died Aug. 30	.....	T
VIII.	" 30	Kaebali	M	70	Hawaiian.....	Lilila St.....	Died.....	.....	T
IX.	" 30	Paaina	M	50	"	Peleula	Died.....	.....	T
X.	Sept. 3	Kealakai.....	M	65	"	Lunalilo Home	Died Sept. 3	.....	T
XI.	" 3	Keawe	M	40	"	Anwaiolimu	Died Sept. 3	.....	T

"T" in last column indicates *Typical Case*.

LIST OF PATIENTS ENTERED ON THE RECORD BOOK OF THE CHOLERA HOSPITAL AT KAKAAKO.

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No.	Date of Entry.	Name.	Sex.	Age.	Nationality.	Locality.	Result.	Remarks.	Type of the Case
	1895								
1	Aug. 30	Henry Simeona.....	M	31	Hawaiian.....	Back of St. Louis College.....	Recovered	{ Pulsless & Collaps- ed when entered.	T
2	"	Annie	F	28	"	Leleo	Died Sept. 1	.....	T
3	"	Emily M. McKeague	F	25	"	Kaakopua, Fort Street.....	Died Sept. 2	.....	T
4	"	Makakoa Smith.....	F	37	"	Kapuukolo	Died Aug. 31	.....	T
5	"	Mary Kaleiwohi	F	41	"	Kapuukolo, Armstrong Block..	Died Aug. 30	.....	T
6	"	Filipo Kakimilo.....	M	45	"	"	Died Aug. 30	.....	T
7	"	Jack	M	50	"	Aala, Bay View..	Died Aug. 30	.....	T
8	"	Keakelekia	F	13	"	"	Died Sept. 1	.....	T
9	"	Paku.....	M	50	"	Kapuukolo, Kekaulike Street..	Died Aug. 31	.....	T
10	"	Haawinaapo.....	M	54	"	Kukuluao	Died Aug. 31	.....	T
11	Sept. 1	Kabana	M	35	"	Kikihale	Died Sept. 1	.....	T
12	"	1 Kainoa	M	45	"	Kekaulike Street	Died Sept. 1	.....	T
13	"	1 Waianuhe	M	60	"	Kakaako	Died Sept. 1	.....	T
14	"	2 Napoleon Kalili Kauli	M	43	"	Kapuukolo	Died Sept. 1	.....	T
15	"	2 *Mua.....	F	70	"	Leleo	Died Sept. 3	.....	T
16	"	2 *Kahakauala	M	17	"	Kawa.....	Died .....	.....	T
17	"	3 *Lono.....	M	30	"	Punchbowl st., near Mormon ch.	Died .....	.....	T
18	"	3 *David Pau.....	M	35	"	Kalihi	Died .....	.....	T
19	"	3 Keluia (No. 1)	F	33	"	Maunakea and King Streets....	Died Sept. 6	.....	T
20	"	3 Kabilo	F	43	"	Kapuukolo	Died Sept. 3	.....	T
21	"	3 Paku, Jr.....	M	14	"	Immigration Depot.....	Recovered.....	.....	M
22	"	4 Kukaulali	M	43	"	Immigration Depot.....	Recovered.....	.....	M
23	"	4 F. Godfrey (Reporter)	M	51	American.....	Honolulu.....	Recovered.....	{ No Cholera Symp- toms at all.	O

* Dead when brought in. "T" Typical case. "M" Moderate type. "O" Not a case of cholera.

LIST OF PATIENTS ENTERED ON THE RECORD BOOK OF THE CHOLERA
HOSPITAL AT KAKAAKO.—Continued.

No.	Date of Entry.	Name.	Sex.	Age.	Nationality.	Locality.	Result.	Remarks.	Type of the Case
	1895								
24	Sept	Mrs. Louisa Kapahi	F	32	Hawaiian	Kapalama	Died Sept. 5	.....	T
25	"	*Kanakolo	F	83	"	Kapalama	Died ..	.....	T
26	"	*Kalewo	M	35	"	Puunui	Died ..	.....	T
27	"	*Katuakini	F	40	"	Punchbowl st., near Mormon ch.	Died Sept. 6	.....	T
28	"	*Kelua (No. 2)	F	80	Hawaiian	Kapuukolo	Died Sept. 15	{ Last chol. symptoms were on 8th Sept. Death was due to nephritis.	M
29	Sept.	Pono	F	9	Hawaiian	Kapalama	Died Sept. 6	.....	T
30	"	*Keaka	F	80	"	Kauluwela	Died ..	.....	T
31	"	Geo. Jackson	M	30 1/2	Hawaiian	Kapalama	Recovered.	.....	M
32	"	*Paahao or Kalama	M	35	Hawaiian	Kaumakapili	Died ..	.....	T
33	"	Kalamau	F	26	"	Kapalama	Recovered.	.....	M
34	"	Elena	F	5	"	Kapalama	Recovered.	{ Very mild case at the most.	M
35	"	Likapeka	F	4	"	Kapalama	Recovered.	" " "	M
36	"	Luukia	F	5 1/2	Hawaiian	Kapalama	Recovered.	" " "	M
37	"	*Malia (Lahapa)	F	77	Hawaiian	Lunalilo Home	Died Sept. 9	.....	T
38	"	*Naoka	M	70	"	Lunalilo Home	Died ..	.....	T
39	"	*Kala	F	9	"	Honukaha	Died ..	.....	T
40	"	Kealalaina	F	70	"	Kaumakapili	Died Sept. 7	.....	T
41	"	Mrs. Mary Carroll	F	46 Am.	White	Likeke Street	Died Sept. 7	.....	T
42	"	*Kaniua	M	48	Hawaiian	Kapalama	Died ..	.....	T
43	"	Chas. L. Dodge	M	31 Am.	White	Punchbowl Street	Died Sept. 7	Speedy Collapse,	T

* Dead when brought in. "T" Typical case. "M" Moderate case. "O" Not a case of cholera.

LIST OF PATIENTS ENTERED ON THE RECORD BOOK OF THE CHOLERA HOSPITAL AT KAKAAKO.—Continued.

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No.	Date of Entry.	Name.	Sex.	Age.	Nationality.	Locality.	Result.	Remarks.	Type of the Case
1895									
44	Sept.	* Lua.....	F	40	Hawaiian.....	Aala—Bay View	Died .....	.....	T
45	"	7 Rebecca Humeku.....	F	30	"	Kapalama—Waipilopilo	Recovered. ...	.....	M
46	"	7 Pahukoa	F	45	"	Kapalama—Waipilopilo	Died Sept. 7	.....	T
47	"	8 Poepee.....	F	65	"	Kapalama—Waipilopilo	Recovered. ...	.....	M
48	"	8 John Paawa.....	M	65	"	Kapalama—Waipilopilo	Recovered. ...	.....	M
49	"	8 Aie or Kepano.....	M	1½	"	Kapalama—Waipilopilo	Recovered. ...	Diarrhoea of indigestion	O
50	"	8 Babala.....	M	26	"	Kalia—Foot of Sheridan Street	Died .....	.....	T
51	"	8 Luika	F	65	"	Kalia—Foot of Sheridan Street	Died .....	.....	T
52	"	8 Lum Kin.....	M	24	Chinese.....	Punchbowl Street	Died .....	.....	T
53	"	9† Kaneko	M	48	Japanese	Kakaako.....	Died .....	.....	T
54	"	9† Mary Puahiwa.....	F	21	Hawaiian.....	Waipilopilo	Recovered. ...	.....	M
55	"	9† Keoholiko	F	18	"	Waipilopilo	Recovered. ...	.....	M
56	"	9 Kahananui	M	35	"	Kalia—near Sheridan Street....	Died Sept. 10	.....	T
57	"	9 Makanui	M	37	"	Puunui	Died Sept. 9	.....	T
58	"	9 Solomona	M	4	"	Puunui	Recovered. ...	.....	M
59	"	10 Kukana Kaia.....	F	37	"	Puunui—West.....	Died Sept. 10	.....	T
60	"	10 Sam Kukona	M	40	"	Oahu Prison.....	Died Sept. 11	Sunstroke	O
61	"	11 Manuel Cabral.....	M	4	Portuguese	Punchbowl.....	Recovered. ...	.....	T
62	"	11 Antonio Cabral.....	M	30	"	Punchbowl	Recovered. ...	.....	T
63	"	12 Lilia.....	F	21	Hawaiian.....	Kalia	Recovered. ...	.....	T
64	"	12 Hualii	M	60	"	Waipilopilo—Palama	Died Sept. 12	.....	T
65	"	12 Mrs. Hopoe Sniffen	F	32	"	Peterson's Lane—Palama	Died Sept. 13	.....	T
66	"	13 *Kaaumoana	F	55	"	Leleo—Cor. King and Liliha St.	Died	{ Autopsy showed typhoidal lesions.	T

* Dead when brought in. † Died 4 hours after entry. ‡ Taken sick in quarantine. § In Hospital as a nurse before sickness.

LIST OF PATIENTS ENTERED ON THE RECORD BOOK OF THE CHOLERA
HOSPITAL AT KAKAAKO.—Continued.

No.	Date of Entry.	Name.	Sex.	Age.	Nationality.	Locality.	Result.	Remarks.	Type of the Case
1895									
67	Sept. 13	§Elijah Sniffen	M	42 ½	Hawaiian	Peterson's Lane—Palama	Recovered. ...	.....	M
68	" 13	John Kupololei.	M	60	Hawaiian	Punahale—Palama	Recovered. ...	.....	M
69	" 13	Amone	M	68	"	Kalihi—near Catholic Church	Died Sept. 13	.....	T
70	" 14	Geo. Kekaulike.....	M	44	"	Leleo—Liliha and King Streets	Recovered. ...	.....	T
71	" 14	†Mary	F	60	"	Leleo—Taken ill in Quarantine	Died Sept. 14	.....	T
72	" 15	Mary Sniffen	F	18 ½	Hawaiian	Peterson's Lane—Palama	Recovered. ...	.....	M
73	" 15	†Mahoe	F	80	Hawaiian	In Quarantine from Leleo.	Died Sept. 15	.....	T
74	" 16	W. Kekipi.....	M	54	"	Leleo—Cor. King and Liliha St.	Died Sept. 17	.....	T
75	" 17	†Pakele	M	65	"	In Quarantine from Palama.....	Recovered. ...	.....	M
76	" 18	Mrs. Louisa Fisher... ..	F	21	"	Puukolo—Maunakea Street	Died Sept. 18	.....	T
77	" 27	Paina	F	65	"	Kikihaie—Hotel Street.....	Died Sept. 27	.....	T
78	" 28	Paahao.	M	53	"	Insane Asylum.....	Died Sept. 28	.....	T
79	" 30	Kahananui	M	38	"	Station House	Recovered. ...	{ Ordinary bowel complaint.	O
80	Oct. 2	H. H. Wheeler	M	65	American	Insane Asylum ..	Died Oct. 3	Refused treatment.	T
Typical Cases entered at Hospital									
Typical Cases not entered.....									
Moderate Cases entered at Hospital									
Other Cases not Cholera									
								58	
								11	
								18	
								87	
								4	
								91	

* Dead when brought in. † Taken sick in quarantine. § In Hospital as a nurse before sickness.

REPORT ON DISINFECTION OF PREMISES IN WHICH CASES OF CHOLERA OCCURRED.

The movable disinfecting apparatus used for the above purpose was carried on two wagons, which followed closely the cholera ambulance, and consisted of corrosive sublimate sol. 1:2000—in demi-johns; carboys of sulphuric acid; sulphate of iron; sulphur and unslacked lime in barrels. Also spraying machines, watering pots, buckets and whitewash brushes, large iron kettles and galvanized iron boilers. In addition to this outfit a fumigating room was built on a dray and moved wherever it was needed.

Immediately after the removal of a cholera patient by the cholera hospital ambulance, the soiled clothing, bed clothing, mattresses and pillows and matting on the floors of the rooms occupied by the patient was at once destroyed by fire. The unsoiled clothing, crockery and cooking utensils were immersed in boiling water for half an hour, or fumigated with sulphur fumes for 24 hours, four pounds of sulphur being burned for every 1,000 cubic feet of space. The fumigating was done in the infected room if it could be made tight, otherwise it was done in the portable fumigating room mentioned above.

The floor of the room was wet with the solution of bichloride of mercury, and the walls white-washed with a solution of quick lime while still hot—slacked lime being a comparatively feeble germicide. If the floor was of rough boards it was also treated to a coat of hot white-wash. In some cases when the floor was much soiled by the choleraic discharges, the floor was taken up and burned, and the ground underneath covered with lime. In most instances the veranda floors and outside walls of the house were also white-washed. The surface of the ground about the building was well wet with a solution of sulphuric acid 1-50 (a sol. of the 1-1300 being sufficient to kill cholera germs). The water closet or out-house in which the discharges of the patient had been deposited was disinfected with a solution of bichloride of mercury or carbolic acid or quick lime.

When the case of cholera occurred in a house which could not be thoroughly disinfected the building was burned.

It is worthy of note that there was no recurrence of the disease in any place after five days from the time the premises were disinfected, and the occupants used only pure water, and excluded uncooked fish from their diet.

As the supplies of disinfectants available in Honolulu seemed at one time likely to become exhausted, a successful experiment was made by the Hawaiian Electric Co. at the suggestion of the Board of Health, to produce nascent chlorine for disinfecting purposes by the electrolysis of sea water. Several thousand gallons of sea water were pumped by the fire engine into a street watering cart, and subjected to a current of electricity. In a few hours the water was charged with a sufficient quantity of chlorine to render it very effective as a deodorizing agent, as was demonstrated by its effect in more than a dozen water closets and cesspools, and on the contents of the odorless excavator at its dumping grounds. The experiment demonstrated the practicability of producing here, should occasion require it, an unlimited supply of one of the most efficient disinfectants and deodorizers known, and at a very moderate cost.

The thanks of the Board of Health are due to the Hawaiian Electric Co. for the interest they showed in the experiment, and for their trouble and expense in carrying it out.

Respectfully submitted,

J. K. SMITH, M. D.

Agent Board of Health.

REPORT ON THE DESTRUCTION OF CROPS OF TARO AND VEGETABLES.

Honolulu, H. I., October 11, 1895.

W. O. SMITH, Esq.,

President of the Board of Health.

Dear Sir:—

We the committee appointed by you Sept. 29, 1895, to value and devise means of effectually destroying the taro and vegetables growing above and below the Insane Asylum, known as the Kunawai patches, submit the following report:

Number of patches of taro destroyed above the asylum belonging to private parties is 70.

Number below asylum, 17.

Number of vegetable gardens destroyed, 3.

Number of days destroying the above property, 5.

Highest number of men employed, 71.

The taro patches and vegetable gardens were guarded day and night from the commencement of the work until the completion of same.

On the afternoon of the 9th instant all parties having property that was destroyed met the committee and presented their claims, which were carefully considered and talked over, and all agreed to the valuation as set by the committee.

The committee decided that the most effectual way of destroying the taro and vegetables was by cutting them up, root and branch, spreading lime over them, and throwing back into patches.

The class of labor employed by your committee was Hawaiians, who were paid \$1.00 per day and furnished their noon meal and the most of them were also furnished with a suit of overalls.

The work was done under the personal supervision of the members of the committee, at least one member being always present.

The following are the valuations of taro and vegetables, with the expenses incurred in the destroying of same:

Value of taro above asylum.....	\$2785 00
Value of taro below asylum.....	565 00
Value of vegetables	124 75
Labor	333 00
Lime, 36 barrels	72 00
Acid, 26 carboys.....	9 16
Cartage	18 00
Tools now in possession of Board of Health..	9 50
Flags and poles.....	7 20
Clothes for men	77 88
Food for men	34 50
Total	<u>\$4035 99</u>

Signed,

H. R. HITCHCOCK,
W. L. WILCOX,
J. K. SMITH, M. D.

BACTERIOLOGICAL REPORT BY DR. F. R. DAY.

W. O. SMITH, Esq.,

President of the Board of Health.

Sir:—

I beg leave to submit this report of the bacteriological examination of specimens, made by me during the recent epidemic of cholera.

Owing to the lack of proper apparatus, the investigations were carried on at a great disadvantage and considerable labor which would have been unnecessary if there had been a well equipped bacteriological laboratory at my disposal.

Wednesday morning, August 21, 1895, Dr. R. P. Myers handed me two specimens from a case of suspected cholera at Iwilei, the native woman. One was vomited matter, the other intestinal discharge.

The gross appearance of these specimens is covered by the expression "rice-water" and they were typical. They were composed of a clear, colorless watery fluid containing a white, flocculent sediment. Microscopical examination of the intestinal discharge revealed the presence of multitudes of bacteria in the liquid. When stained with fuchsin, the greater part of them were found to be bacilli, short, slightly curved and about $\frac{1}{4}$ as broad as long. Occasionally two of them were joined at the extremities giving a letter "s" or spiral effect.

(Exhibit A is a camera lucida drawing from this preparation.)

The vomited matter contained several varieties of microorganisms, strepto, coeci, diplo-cocci, and bacilli of different sizes, a few bearing a close resemblance to those found in the stool.

(Exhibit B is a camera lucida drawing from this preparation.)

A sterilized untrient gelative tube was inoculated from the intestinal discharge and in 24 hours the line of puncture showed a development which bore the closest resemblance to the growth of the comma bacillus of Koch.

Microscopical examination of this culture revealed a short, curved bacillus identical in appearance with those found in the stools. (Exhibit C is a camera lucida drawing of this preparation.)

A third specimen was handed to me by Dr. R. P. Myers in the afternoon of Wednesday, August 21. It was some of the intestinal discharge from Lono, a kanaka, and was a typical "rice-water" stool. It contained bacilli having the same microscopical appearances as those found in the first specimen.

On Saturday, August 24, Dr. R. P. Myers handed me a specimen of intestinal discharge from Maalo, a kanaka. This was also a "rice-water" stool.

Microscopical examination revealed the presence of many bacilli having the same characteristics as those described in the two preceding cases. (Exhibit D is a camera lucida drawing of this preparation.)

A tube of sterilized gelatin was inoculated from this specimen. Owing to the heat the gelatin did not remain solid and the form of the growth could not be observed. But the microscopical appearance of a preparation from this culture showed it to be made of multitudes of small curved bacilli and spirillae, identical in size and form with those found in the stool. (Exhibit E is a camera lucida drawing of this preparation.)

The germs in these preparations resemble in every way the comma bacillus of Koch which is present in every case of Asiatic cholera and I am convinced that they are the "*Spirillum Cholerae Asiaticae*," or the comma bacillus of Koch.

It will be observed that in these investigations the gelatin tubes were inoculated directly from the specimens instead of first making plate cultures and observing the growth of the colonies. This was done from necessity rather than choice as I had no Petrie dishes or other device with which to make the searatum. The result obtained, however, corroborates the opinion that the germ is the comma bacillus of Koch for the reason that at the end of 24 hours it was almost a pure culture

of this particular bacillus, all the other germs having scarcely begun to grow.

Micrometer measurements of the bacillus made by Mr. A. Johnston show the average diameter to be .03441 m m. (Sternberg.)

On September 28, I received from Dr. Myers a "rice-water" stool from an old native woman named Paina. (Exhibit F is a camera lucida drawing from this specimen.)

I made a plate culture and an Esmarch roll from this specimen, and the colonies developed as do those of the comma bacilli of Koch. A pure culture in gelatin from one of these colonies was composed of comma bacilli identical with those found in the other cases. (Exhibit G is a camera lucida drawing of this preparation.)

These results have corresponded in every particular with those given by the comma bacillus of Koch and it is a satisfaction to have this corroborative evidence as to the nature of the recent epidemic, but in the light of the whole course of the epidemic, this work ceases to be essential to establish the diagnosis of Asiatic cholera, for I think that I voice the opinions of all of the medical men who had the care of the cases that there is no other disease known, that would have followed the course taken by this disease, produced the same symptoms, and attended with such a high mortality, but Asiatic cholera.

Respectfully submitted,

F. R. DAY, M. D.

Honolulu, December 27, 1895.

REPORT OF MR. J. F. COLBURN, CHAIRMAN CITIZENS'
SANTARY COMMITTEE.

Honolulu, Oahu, H. I., Dec. 31, 1895.

HON. W. O. SMITH,

President Board of Health.

Sir:—

Pursuant to your request to furnish your Honorable Board with a condensed report of the Citizens' Sanitary Committee

appointed by the Board on the evening of September 6, 1895, in the recent cholera epidemic.

I have the honor to present you the following, trusting that the same be of value for the uses intended. The gentlemen appointed by the Board to carry out this work were:

John F. Colburn,	Lorrin A. Thurston,
William A. Kinney,	E. C. Macfarlane,
A. W. Carter,	George W. Smith,
F. B. McStocker,	S. K. Kane,
C. L. Hopkins,	John E. Bush.

Immediately upon appointment, we repaired to the office of Messrs. Carter & Kinney (to use as headquarters), and there organized as a body to formulate a system of house to house visitation in order to discover every new case and report the same, and to assist the Board in its efforts to prevent the spreading of the disease.

On the date of our appointment, 48 persons had been stricken down with the disease, and there had been 37 deaths; all of them being Hawaiians, with the exception of an American sailor of the U. S. S. "Bennington." The disease having been confined almost entirely to the Hawaiians and death following so rapidly, and to such a large extent, these people became very much alarmed and suspicious, and immediately any one of them was attacked with any of the symptoms of it, they would secrete the matter until it was, in a large proportion of the cases, too late to save life.

In order that we might carry on our work effectively, our first duty was to notify the Hawaiians (by distributing printed statements), that an inspection was going to be made of every house in the district and that the visitation was going to be kept up for an indefinite time for the purpose of stamping out the disease and calling upon them to assist us in every possible manner.

We then divided the district of Kona, known as Honolulu and adjoining valleys, into 21 districts, and appointed an inspector for each district. He in turn divided his districts into apanas (lots or wards) and appointed sub-inspectors for each

apana; some districts having more than others, the number being according to the location of the district. In all there were 151 apanas, and 256 sub-inspectors.

We issued instructions to each inspector as to what his duties were, and he in turn directed his subordinates; the most important one being to insist upon the Hawaiians using cooked food and boiled water, and reporting at once any ailment they had.

On the morning of our first inspection, we caused a census to be taken by each sub-inspector of the persons in his apana, and submitted the same to the inspector of the district, who in turn prepared an enumeration of the inhabitants, and filed the same with the Committee. From this census we found the population of the entire district to be 28,061, divided as follows:

Hawaiians	10,419
Chinese	7,522
Japanese	2,069
Portuguese	3,845
Other foreigners.....	4,206

The sub-inspector then continued his tour of inspection semi-daily making out reports of his findings to the inspector. This gentleman then condensed the reports of his subs, and filed them with his own, to the Committee twice a day. The total number of reports filed by the inspectors being 526, and to them by the sub-inspectors, 8,156. A talley sheet was kept of the time of the day and night the inspectors submitted their reports.

The Committee divided themselves into sub-committees and took turns remaining at headquarters to receive the reports of the inspectors and their subs, and to send out daily instructions, also to receive messages and report to the Board all matters pertaining to the health and condition of the district, and distribute a mixture prepared by Drs. Brodie and Murray. I may mention here that owing to certain reports sent out by evil disposed persons about the medicine that was being furnished by the physicians of the Board and also the large per-

centage of deaths up to our appointment, the majority of Hawaiians refused to take any medicine whatever, unless the same had been made up by the above doctors. About 2,000 2-ounce vials were given away.

Together with the duties of the semi-daily inspection that the sub-inspectors had to perform was also the responsibility of looking into, and investigating the circumstances of indigent persons, more especially the Hawaiians, and report the same to the inspectors, who upon such information, issued to the persons in need of supplies, a ticket on the Hawaiian Relief Association, a company of some of the noble ladies of Honolulu who had received a large amount of money from the subscription of generous firms and individuals, and had stationed themselves in a building on Bethel street, to supply those that were in actual need. The relief afforded by this association brought about the confidence of the Hawaiians to a large extent, and it tended to assist our situation a great deal.

After our system of inspection was in fair working motion, no person could move from one district to another, without the permission of the Board was first obtained. The records of the permits so granted were sent to the committee, and we advised our inspectors at once, who in turn informed their subordinates. By this means the migratory element of our community was kept in check, and it greatly assisted our work.

This committee, with its inspectors and subs, continued their earnest work until September 23, when a thorough cleansing, white-washing and disinfecting was ordered by the Board under the superintendence of this Committee, together with the gentlemen of the "ways and means" committee, of certain portions of the district, declared and mapped out as infected districts. A large quantity of lime, acids and brushes and brooms, viz:

206 barrels of lime,
1,800 gallons white solution,
2,100 gallons blue solution,
1,185 brushes,
462 brooms.

These were divided and placed at 51 different distributing stations, viz:

District 1	Station 1	District 9	Station 1
" 2	" 1	" 18	" 2
" 3	" 8	" 20	" 3
" 5	" 12	" 21	" 21
" 8	" 2		

The above were used in renovating and cleaning. Their results were highly satisfactory.

September 24, the Committee feeling that the disease had disappeared, resolved to inform your Body that our system of inspection would no longer be kept up and adjourned "sine die." From the date of our appointment till our adjournment, there were 37 new cases, and of the same, there were 22 deaths, the same being:

18 Hawaiians
 1 Chinese,
 1 Japanese,
 2 other foreigners.

Thus showing that the house to house, semi-daily visitations were the means of bringing to the Board prompt information, and, as a result, early treatment; and of these, a fair percentage recovered.

Mr. C. V. E. Dove, surveyor, prepared a file of maps of 16 districts for the Committee giving the approximate location of

District 1,	289	District 13,	299
District 2,	385	District 14,	345
District 4,	798	District 15,	154
District 9,	476	District 16,	333
District 10	483	District 17,	189
District 12,	44	District 18 & 19,	310
		District 20,	262
			72

Total, 4768

I enclose herewith for your examination and to be filed away in the archives of the Board the following data bearing upon our work:

1. Report of the Committee to the Board.
2. Copies of our instructions to inspectors.
3. Copy of our communication to the Hawaiian Relief Association, and the list of their agents.
4. List of the Comitée, divided into sub-committees.
5. Blank census report.
6. Official census sheet made by our Committee, September 8, 1895.
7. Official talley sheet of inspectors' reports.
8. Regulation of the Board forbidding change of residence from one district to another, and showing the boundaries of the 21 districts as divided by us.
9. Blank inspector and sub-inspector, semi-daily report.
10. Blank Committee's sanitary report to the Board of Health.
11. Blank change of residence permit.
12. Instructions to inspectors—uninfected districts.
13. Instructions to inspectors—infected districts.
14. Plan showing line of infected district.
15. Regulations of the Board regarding house cleaning, and the circular letter of the Committee for Monday, Sept. 23.
- 16 and 17. Blanks furnished to those desiring material in re house cleaning, and the list of the distributing stations.
18. List of the inspectors and sub-inspectors, with the description of the districts and apanas.
19. Twenty-one enumerated census reports, one from each inspector.
20. One bottle of Dr. Brodie and Murray's cholera medicine.

RECAPITULATION.

Members of the Committee.....	10
Districts	21
Inspectors	21
Apanas	151
Sub-inspectors	256
Inspectors' reports furnished	526
Sub-inspectors' reports furnished.	8,156
Population of entire district.....	28,061
Inhabited buildings of 16 districts.	4,768
Barrels of lime used.....	206
Gallons of white solution used...	1,800
Gallons blue solution used.....	2,100
Brushes used	1,185
Brooms used	462
Distributing stations	51
Vials of medicine given away....	2,000
Days in service	18
Cases of cholera in that time.....	37
Deaths from cholera in that time..	22

I have the honor to be

Yours most respectfully,
 JOHN F. COLBURN,
 Chairman.

 CIRCULAR.

 OFFICE OF THE CITIZENS' SANITARY AND RELIEF
 COMMITTEE.

Honolulu, September 13, 1895.

To Sanitary Inspectors and Sub-inspectors:

Gentlemen:—The presence of cholera in Honolulu is costing the country many lives and tens of thousands of dollars every week.

It has paralyzed business and will continue to do so until it is stamped out.

Whether the stamping out process shall take a few days, or shall drag along for an indefinite period, depends upon you, and each one of you.

The Citizens' Committee, the Board of Health, the quarantine system, are all secondary in importance. You and you alone, can stop the cholera in Honolulu.

The reason of this is, first, that the most dangerous source of contagion is the vomit and excreta attendant upon the early stages of the disease; dangerous because it is full of cholera microbes, and because the ignorant people among whom the disease usually occurs, almost always wash the soiled clothing, instead of disinfecting or destroying it, thereby contaminating the water and spreading the contagion broadcast. And second, because there has been, is, and will continue to be, concealment of cases, which only continuous and searching inspection will prevent. And further, the sole chance of recovery of individual cases is the receiving of treatment in the early stages of the disease.

The only way to meet and check this is to discover and report the disease at an early stage.

On account of the rapidity of development of the disease this can be done only by personal, house to house and room to room inspection, **TWICE A DAY.**

An instance has come to the knowledge of the Committee in which the morning inspection was omitted. A case which developed early in the morning, and which would have been found had inspection then been made, was not found until late in the afternoon, when the patient was nearly dead, and soiled clothes had been washed in an adjacent stream.

In another instance the inspector found a house shut up at his morning visitation and received no answer upon knocking. He went away. In the afternoon it was found that there was a cholera patient in the house when the inspector called in the morning, which would have been discovered had the inspector insisted upon an entrance in the morning.

The Committee and the twenty-one sanitary inspectors are

giving their entire time to this matter, and several hundred sub-inspectors are giving a large proportion, many of them all of their time to it.

The inspection of the city is no more thorough or effectual than that made by the most inefficient inspector.

One case of cholera a day will as effectually lock up the city and kill business as twenty.

It is no use for 199 inspectors to do careful work if the 200th man, by neglect, is to allow cholera to get a fresh hold.

It is unfair to yourselves, unjust to the Committee and your fellow inspectors and criminally negligent of the lives and property of the people of this city, for any one of you to agree to inspect a portion of the city and then fail to do it, or do it in a negligent or careless manner.

Neither is it sufficient for you to simply go to each house and make general inquiry as to health, and cursory examination of the premises.

Call the roll of persons living in every house upon each visitation. If this is done without fail no case can escape you.

Report immediately every case found by you in which there is vomiting, diarrhoea or other symptoms of cholera.

Report immediately any person living in your district who does not belong there.

Examine for and report every unsanitary condition found.

All reports whether of sickness, change of residence or unsanitary condition, should give the exact locality and name of the person, householder or owner, so that the person and place can be identified and found from the description.

It is suggested to inspectors that they personally accompany each sub-inspector on several visits in order to be certain that they understand the methods of thorough examinations..

By order of the Committee,

F. B. McSTOCKER,

Secretary.

REPORT OF COMMITTEE ON CONTAMINATION OF SOIL AND WATER.

Honolulu, Sept. 25, 1895.

HON. W. O. SMITH,
President Board of Health.

Sir:—

Your committee appointed to investigate the matter of contamination of soil and water by cholera germs, begs leave to submit the following report:

Every locality in which cholera has occurred has been visited and surveyed by the committee. A list of seventeen localities was furnished the committee by the Board of Health office. Of this number five general localities claim special attention, on account of their close proximity to large bodies of water which may have become contaminated by the introduction of infectious material from persons sick with cholera previous to removal to the cholera hospital.

These localities are Waipilopilo, the banks of the Nuuanu stream, the harbor and vicinity, Kunawai and Puunui.

Waipilopilo is the region directly makai of the tramways terminus, near the Kamehameha Schools, comprising a strip of land running from King street southwest to the sea. A map of this locality is attached to this report.

The dry land here is high, of coral formation, and descends abruptly to the wet, low-lying rice land which borders it on the southeast. For a distance of about 600 yards from King street the high land borders directly on the rice fields. From this point down to the sea a shallow ditch intervenes.

Reference to the appended map will make this clear. Native houses were scattered along down this strip of land from King street to the sea, standing back, as a rule, from twenty to fifty yards from the edge of the rice land. Most of these houses have been burned.

The first house in this locality in which the disease made its appearance stood about 200 yards from King street and

about thirty yards from the rice field. This was a two story house in which twenty-four people were living. About four feet from the edge of the rice field was a washing stone and four feet or so from this was a surface well. Water drained from the washing place directly into the rice field and also into the well. It is known that clothing stained with the infectious discharges of persons sick with cholera were washed on this stone. The rice field into which this infectious material found access lies just mauka of the O. R. R. track and is about $1\frac{1}{4}$ acres in area. It is well bounded on the mauka and Waikiki sides by a high limiting bank.

It drains through a culvert in the R. R. track across to a rice field lying makai of the track. This latter field has an area of about $3\frac{3}{4}$ acres, and empties into the ditch mentioned above which at this point intervenes between the high land and the large extent of rice land lying off to the south.

This shallow ditch runs along between the high land upon one side and the rice fields, as far as they go, upon the other. As it approaches the sea the rice land gives way to marsh and fish ponds. The fish ponds connect with each other but have no connection with the ditch until just before it empties into the sea. The ditch is separated from the rice fields by a slight mud bank, but in numerous places this bank is so low and frail that the danger of these large rice lands becoming infected is imminent.

At short distances along down the course of this ditch are washing places in the ditch and surface wells near its border. Just below the point where the infected rice fields empty into the ditch stood the second house where cholera made its appearance. The house stood back from the ditch about twenty-five yards and a beaten path led from the house to the washing place in the ditch. Clothing stained with cholera discharges are known to have been washed here.

About 230 yards farther down the course of the ditch the next case occurred. The fourth and last house in this locality in which cases occurred stood about seventy yards from the point at which the infected ditch empties into the sea.

Kunawai lies makai of the extension of Judd street, west of Liliha. There was one infected house in this locality. The house stood upon high land on the hillside. At the base of the hill, at a level of about fifteen feet or so below the house, a small irrigating ditch runs along under the fence. Just beyond this ditch was the washing place, a hole about four feet in diameter, dug in the ground. A small drain carried the water from the ditch into this hole, which disposed of its surplus water by overflowing on the ground.

Just beyond the washing hole are two old taro patches, at present grass grown, and beyond these a large extent of growing taro. From a point just above the washing hole a small drain leads water from the ditch into the unused taro patches and through them directly into the patches of growing taro.

The soiled clothing of the sick man was washed on the grass near the edge of the washing hole. There is no direct drainage from this place into either the taro patches or the ditch, but a heavy rain could undoubtedly wash material from the edge of the washing hole, on the surface of the ground into the old taro patches and thence into the growing taro.

About $\frac{1}{3}$ mile to the eastward of this locality is the Kunawai spring from which the people in the neighborhood generally get their water for drinking purposes. It is impossible for surface water to drain into this spring.

We found that the Board of Health agents had been to the infected premises and used lime generously all over the neighborhood. The house has been burned.

Puunui. The infected house in this locality stood in the centre of a taro country, at a point to the east of the extension of Liliha street about one-sixth mile above Judd. The land upon which the house stood is about thirty feet square and is surrounded upon all sides by taro patches. It is itself only a dry portion of a taro patch and can be reached only by walking upon the mud wall dividing the patches of growing taro.

There is some doubt about this case having been cholera—the man being dead when reported. If it was cholera and if the discharges were thrown into the taro patches, which seems

probable, it is impossible to say to what extent the disease germs have been carried by the water. Any attempt at disinfection, short of drying up the entire crop of taro (many acres in area) would be futile.

The Nuuanu stream in all probability became infected originally from the case of Lono, a runaway from Iwilei, who became sick in a house upon the Pauoa creek at a point above its junction with the Nuuanu stream. This house stands upon the south bank of Pauoa creek about 135 yards below Vineyard street and 200 yards above the point at which it flows into the Nuuanu stream. Near the house and on the brink of the stream is a washing place where undoubtedly the cholera soiled linen of the sick man was washed.

The next case reported was on the bank of Nuuanu stream shortly below its contamination by the now infected Pauoa creek. This house stands about 330 yards down stream from the one last described.

Other cases appeared near the mouth of the Nuuanu stream.

To the left of the point at which the Nuuanu stream enters the harbor is a coral ledge which is uncovered at low tide. The filth bearing waters of the stream spread over this ledge and stand in pools when the tide is low. Houses have been built upon piles over this coral ledge and in these houses and the neighboring ones upon King street, cholera promptly gained a foothold. As all discharges from the persons sick in these houses were emptied into the water over which the houses stand, fresh contamination was added to the already infected waters.

Across from the Oahu Ry. depot is a block of stores, fronting on King street. The rear portions of these buildings, used as dwellings, overhang an old fish pond, and in one of these overhanging rooms cholera appeared. The discharges were thrown into the fish pond. This pond receives water from other ponds farther mauka and discharges its surplus water through a drain which runs under King street and the Oahu Ry. lands into the harbor.

This pond is full of filth, and the wash water from the neigh-

boring houses empties directly into it. Cases appeared in one other house in this locality.

The other localities where cholera has appeared are all remote from any streams or stagnant water.

Soil. The infectious material has undoubtedly found its way into the soil in many localities. This is not a serious matter where the land is dry and there is no surface drainage into any well, spring, stream or pool of water.

In a number of places clothing and bed linen soiled with infectious discharges have been washed in wash houses on the premises. These wash houses are generally rough board affairs about six or eight feet square, roofless, but having loose board floors. The water in these cases has gone through the floors and onto the ground beneath.

In numerous instances the infectious discharges have been thrown down privy vaults.

Since the discovery of the cholera spirillum by Prof. Koch, numerous experiments have been made by physicians to determine the length of time it may live in soil, water and other media, and some important facts have been established. There is, however, a wide difference between the results of experiments conducted in the laboratory and those attained in nature.

The greatest enemies of the spirillum of Asiatic cholera are other micro-organisms found in nature. At all times many varieties of bacteria find their natural habitat in air, soil and water—both fresh and salt. The cholera spirillum will for a time live and multiply in the soil and in water, but eventually it will be overcome and destroyed by the other bacteria whose territory has been temporarily invaded.

The following is taken from Sternberg's Bacteriology: "Koch found the cholera spirillum in water in a tank at Calcutta during a period of fourteen days, and in his experiments, showed that it preserved its vitality in well water for thirty days, in Berlin sewer water for six to seven days and in the same mixed with faeces for twenty-seven hours only. In the experiments of Nicati and Rietsch the cholera spirillum

preserved its vitality in distilled water for twenty days, in sewer water (of Marseilles) thirty-eight days and in water of the harbor for eighty-one days. The numerous experiments recorded by the observers named and by Bolton, Hueppe, Hochstetter, Maschek, Kraus and others, show that while the cholera spirillum may sometimes quickly die out in distilled water, in other experiments it preserves its vitality for several weeks (Maschek) and that it lives still longer in water of bad quality, such as is found in sewers, harbors, etc.

It has been found that harbor water contains many varieties of bacteria, and that the numbers present near the surface and at different depths do not vary in any great degree. In marked contrast to this it is found that the mud at the bottom of harbors contains many thousands of times as many bacteria per c. c. as are contained in the harbor water.

Water at a temperature of 70 degrees F. (or that of the water in and around Honolulu) is much more favorable to the life of the cholera spirillum than water at a lower temperature."

Again quoting from Sternberg: "Giaksa has made extended and interesting experiments with the cholera spirillum, cultures of which he added to different kinds of soil (garden earth, clay and sand) and placed at different depths below the surface, one-quarter, one-half, and one metre. Some of the earth was sterilized and some was not. In unsterilized earth he found the cholera spirillum in considerable numbers at the end of twenty-four hours at the greatest depth tested (one metre), but at the end of forty-eight hours it had disappeared in five experiments out of seven. The lowest temperature at this depth was 20 degrees C. (68 degrees F.).

In sterilized soil the result was different; the cholera spirillum was present in enormous numbers at the end of four days at a depth of a metre and was still found in smaller numbers at the end of twelve days, but had disappeared at the end of twenty-one days.

"This indicates that the presence of the common saprophytes in the soil is prejudicial to the development of the cholera spirillum and that under ordinary circumstances it succumbs in

the struggle for existence with these more hardy micro-organisms."

The temperature of the atmosphere and of the water in this country, together with the moist condition of the soil and the prevalence of surface pools of water render it extremely probable that the cholera spirillum may live here for a great many days.

The Nuuanu stream and the harbor seem to possess all of the conditions necessary for the preservation of the vitality of the germ for a long time. That portion of the harbor in the neighborhood of the mouth of the stream is a particularly dangerous locality. The water of the stream carries in solution the elements most favorable to the preservation of the spirillum. The current is sluggish. The bottom of the harbor and the coral ledge bordering it are covered with mud rich in organic material. The crabs, shrimps and small fish which are present in myriads may have some office in preserving and carrying the germs of the disease.

Bacteriological experiments are now being made with specimens of water taken from various sources known to be infected.

GENERAL RECOMMENDATIONS.

The following are the recommendations of your committee:

1. That all local wash houses in infected localities be torn down and the ground beneath them disinfected and then allowed to dry thoroughly. That all persons be prohibited from washing any clothing or throwing and soiled water, discharges or other organic matter into any stream or pool of water. That all persons who wash their clothing at home be requested to do so in a dry, sunny spot where there is no drainage into any pool or stream of water.

2. That as far as practicable all unnecessary pools or ponds of stagnant and semi-stagnant water be filled in, beginning with the infected localities.

3. That the building of houses, wash houses, or closets over streams, ponds or portions of the harbor be prohibited, and that all such houses now standing be removed.

4. That all sewer pipes emptying into the harbor be abolished.

SPECIAL RECOMMENDATIONS.

5. In the Waipilopilo district we recommend the immediate condemning of the infected rice fields, the re-enforcement of the bank dividing the ditch from the uninfected rice fields; measures to disinfect as thoroughly as possible the infected rice fields and the ditch; the filling up of all surface wells in the district; the prevention as far as is practicable of all use of this water or the fish therein by any person for any purpose for a period of time to be determined by the Board of Health.

6. In the Kunawai district disinfection seems to have been thorough and there is considerable doubt as to the infectious material having reached the taro patches. In case it has done so the committee are of the opinion that it has passed beyond control. We recommend keeping up a rigid inspection over this district and all others through which the water from this district drains. If other cases of cholera occur lower down, the question of drying up the taro will have to be considered.

7. In the Puunui district we make the same recommendations as in the Kunawai district.

8. The Nuuanu stream. Your committee regards this locality, together with the harbor, to be by far the most serious problem with which the Board of Health has to deal. The lower portion of Pauoa creek and the Nuuanu stream from the point where the Pauoa creek joins it down to the sea are unquestionably infected and all persons should be absolutely prohibited from using any water from these infected sources or taking any fish from them until such a time as nature has purified them. It is also important that no discharges, wash water, poi water, sewage or other organic material should be thrown or discharged into the stream for a like period of time. Periodical flushing of the stream should be continued for several months—say throughout the rainy season. We urge upon the Board of Health the importance of walling the stream in upon both sides at the earliest possible date as a necessary health measure.

9. The harbor. In view of the fact that there is direct evidence that a number of the persons who were taken sick with

cholera during the late outbreak had been eating raw fish or crabs from the harbor and further, that there is good authority for the statement that harbor water is particularly dangerous, the cholera spirillum having been found in at least one instance after eighty-one days in harbor water, your committee recommends that all persons be prohibited from bathing in the water of the harbor or from taking crabs, shrimps or fish of any kind from the harbor or the coral reefs bordering it for a period of three months from the present time; further that immediate steps be taken to improve that portion of the harbor in the neighborhood of the outlet of the Nuuanu stream in such manner that the present unsanitary condition shall be removed.

10. We recommend the filling in of the old fish pond across from the railway depot.

C. B. WOOD, M. D.

J. T. CRAWLEY,

B. F. DILLINGHAM.

Honolulu, H. I., October 11, 1895.

W. O. SMITH, Esq.,

President of the Board of Health.

Sir:—

Your committee appointed to investigate the matter of contamination of soil and water, beg leave to report the following:

Since submitting our report to you under date of September 25, the rice patches referred to in said report and condemned by your Board, have been drained through the Waipilopilo ditch. The embankment of the Waipilopilo ditch on the southwest side has been raised to prevent an overflow of contaminated water into other patches.

Ho Pa Yet and family, the Chinese who were living in close proximity to the infected rice patches, have moved to another house at a safe distance from the infected locality.

Mr. J. A. Low, who took charge of the work of draining the condemned rice fields, found it impossible to drain successfully the field directly mauka of the railway line without turn-

ing off the water from two other patches adjoining on the mauka side of the condemned patch referred to; to do this it became necessary to destroy one and a half acres more of thrifty growing rice.

Ho Pa Yet owned a large flock of ducks (100 in all) which were running and feeding in the infected rice field. Your committee deemed it a safe precaution to have the ducks killed and burned.

Ho Pa Yet rendered to us a claim for the following items of damages:

To 7 acres of condemned rice crop,	
at 2 $\frac{1}{4}$ tons—15 $\frac{3}{4}$ tons at \$43.....	\$ 677 25
Expense of moving out and return.	30 00
Extra rent of dwelling house 6 mo..	60 00
Rent of land.....	100 00
100 ducks	30 00
Destruction to banks and filling up	
ditches	200 00
	<hr/>
	\$1,097 25

After a careful consideration of the above claim, your committee have awarded \$660.00 as per enclosed bill, which Ho Pa Yet and W. R. Castle, mortgagee, have agreed to accept without prejudice to their right to the full amount of their claim, if the enclosed bill is not settled in due course.

Mr. Ah In of Chin Wo & Co. furnished a number of men, and completed the work of raising the embankment of the Wai-pilopilo ditch as directed. For this service Mr. Ah In declined to make any charge, saying that he was glad to join with others in rendering all possible assistance to the Board of Health in their effort to rid the country of disease.

Your committee respectfully submit that they have performed the duties assigned to them, and beg to be discharged.

Respectfully submitted,

C. B. WOOD, M. D.,

J. T. CRAWLEY,

B. F. DILLINGHAM.

